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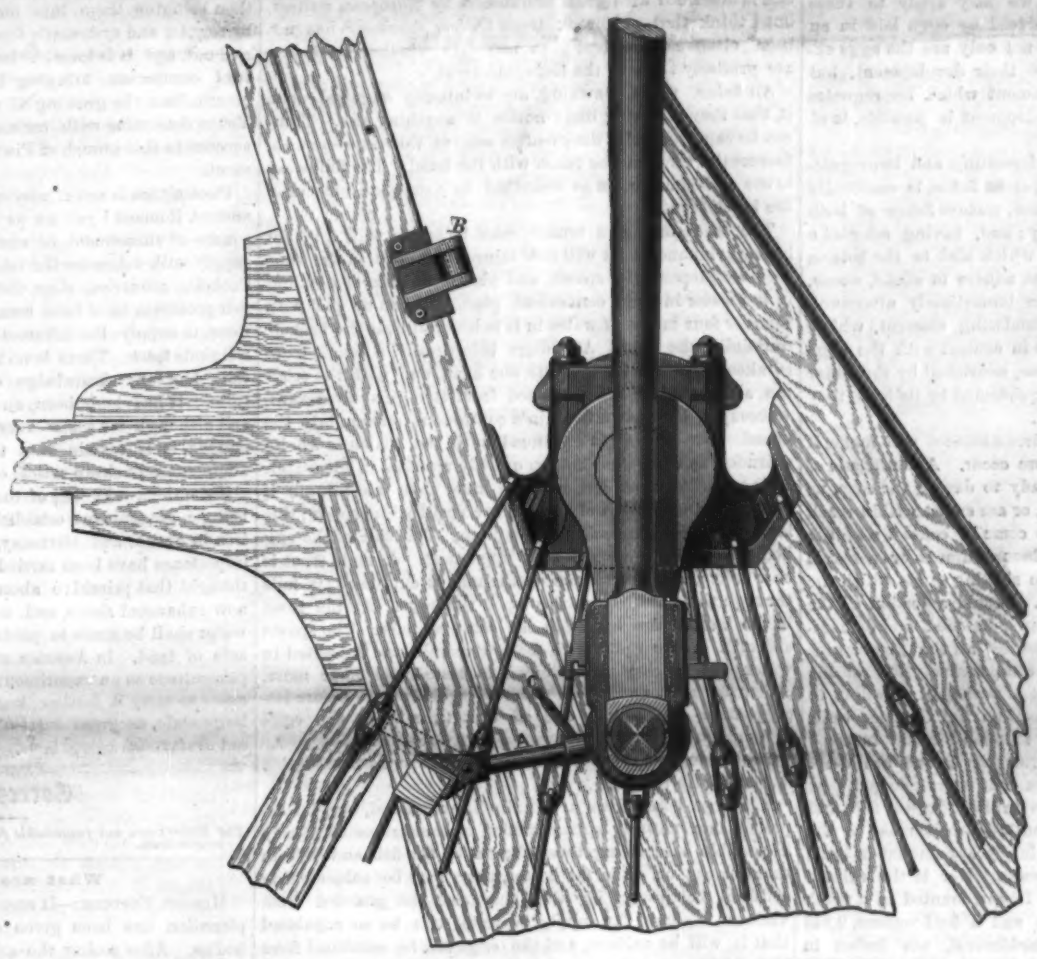
Adaptation of the Hydraulic Jack to Starting Engines from their Dead Centers.

It is well known to engineers of beam engines, especially when used on shipboard, that occasionally the hanging of the engine on its centers is a source of considerable annoyance and loss of time. It is a severe strain to an engine when in such cases steam is admitted alternately above and below the piston, and it is dangerous to the men and damaging to the wheels to attempt to move the engine from its dead center by means of the wheel buckets.

The engraving exhibits the attachment of the ordinary hydraulic jack to the frame of a beam engine for the purpose of starting it from the centers. A, is a jack placed in proper position for acting on the crank when on the lower center, and B shows the location of one for actuating the crank when on the upper center. Both these jacks are pivoted to bases so that they can be swung out of the way when not in actual use, the dotted lines at A denoting the position of that jack when swung back; that at B, being represented as already in that position. The lower one is moved in a vertical and the upper in a horizontal plane.

A few strokes of the lever—seen at C on the lower jack—will suffice to move the crank far enough to give lead to the engine, and it can be operated in a moment by one man. No further explanation is required by any engineer to see the value of this application. Any further information can be obtained by addressing W. W. Vanderbilt, General Superintendent of Hulls and Machinery of the Pacific Mail Steamship Co., corner of Avenue D and 12th street, or Alfred Sims, Novelty Iron Works, 12th street, East River, New York city.



VANDERBILT AND SIMS' APPARATUS FOR STARTING ENGINES.

ORNAMENTING GLASS, PORCELAIN, ETC.

A method of ornamenting glass, porcelain ware, etc., with photographic pictures, has been invented by W. Grüne, of Berlin, which also contains a new method of preparing negatives so that positive films may be readily printed and removed from the negative. The negative, after being fixed and toned with chloride of platinum, is dried and varnished with a glassy flux which is annealed upon the negative by heat in a common muffle. The photographic film being now protected the negative may be dipped in water, acids, and other solutions with impunity. To produce positive prints one side of the negative plate is covered with collodion, sensitized, exposed to light, fixed and toned in the usual manner. The positive film may be then detached by loosening one corner with a soft brush and floating it off in a vessel containing water and a little glycerin. Any number of films may be thus printed and floated. The film may now be floated upon the surface of the glass or porcelain which is introduced into the water vessel, a soft brush being used to spread the film nicely. The film is now covered with the glass flux, and then annealed in a muffle as before described.

By toning the film prior to annealing with different metallic salts, a variety of colors may be produced on the picture. For example, if gold color is wanted, the films are treated with chloride of gold; steel color, chloride of platinum; black, chloride of iridium; brown, chloride of palladium. If the different salts are applied to different parts of the film, the various colors will be seen combined in the picture after it is annealed, and beautiful effects may be produced. The pictures may be polished and burnished subsequent to the annealing process in the usual manner.

A Specimen of Hydrogen from Stellar Space.

The eminent chemist Graham, has made some curious experiments, by which it was proved that at high temperatures, iron would absorb several volumes of the gas to which it was exposed, and retain the same on cooling. He has now extended these experiments in a curious direction. Taking a piece of the meteoric iron of Lenarto, and heating it in vacuo, he obtained about 2·8 volumes of hydrogen. This would prove that when last red-hot, this meteorolite was immersed in a dense atmosphere of hydrogen. A large class of the fixed stars show strong hydrogen bands, and one of the bright lines found in all nebulae indicates the same element, and the remarkable temporary star seen in May of 1866, indicated the presence of an intensely heated atmosphere of hydrogen. It would thus seem that the gas obtained from this piece of meteoric iron, by Professor Graham, is a literal sample of that which, among stellar bodies, is recognized by other properties, through the aid of the spectroscope.—*Franklin Journal.*

MACHINE FOR FLUTING TRIMMINGS, ETC.

The little machine seen in the engraving is a valuable improvement on the common fluting machine, in that the material can be withdrawn at any stage of the operation without running the ruffle entirely through or reversing the motion of the fluting rollers.

The rollers are of brass or other non-conducting metal, hollow, to allow of the introduction of heaters of iron, copper, soapstone, or other material, and mounted in a suitable frame, as seen, one end of which is open to allow of the material being slipped off the end of the roller or introduced at that point. The upper roller turns in fixed bearings and is rotated by a crank. The under roller is suspended on a forked support, pivoted at its rear end, and sustained in position by a powerful spiral spring. It may be depressed by means of a cam lever working in a stand, which, when raised, as in the engraving, separates the two rollers. Thus, a ruffle or any article it is designed to flute, may be fluted to any particular point and then instantly withdrawn. In manufacturing fluted trimmings and also for laundry and household purposes this machine will be found very convenient.

Patent pending through the Scientific American Patent Agency. Further particulars may be obtained by addressing Newman & Capron, 1,172 Broadway, New York city.

What Is Obsidian?

When Hernando Cortes invaded Mexico he was met by a warlike people who disputed every inch of his way and wielded heir battle axes and two-handed swords of obsidian with as terrible effect as ever the knights of old their weapons of Damascus steel. From Dr. Feuchtwanger's "Teatise on Gems" we extract the following account of this mineral:—

Obsidian was familiarly known to the ancients, and its name is said to be derived from a Roman, who first brought it to Rome from Ethiopia. Pliny states that the Romans manufactured mirrors and gems from it; the Mexicans and Peruvians manufactured their knives, razors, and sword blades from obsidian, which appears to have served as a complete substitute for other materials with those nations, who were yet unacquainted with the use of iron for weapons and utensils of various kinds. Baron Humboldt says that Cortes mentioned, in his letter to the Emperor Charles V., having seen razors of obsidian at Tenochittan; and the above naturalist likewise discovered, on the Sierra de las Nabajax, in New Spain, the old shaft that was used for raising the rough obsidian, with relics of the tools and half-finished utensils.

The inhabitants of Quito manufactured magnificent mirrors from obsidian, and those of the Azores and Ascension islands, and Guiana, used splinters of obsidian as points for their lances, razors, etc.

Specimens of arrows and other articles, such as octangular wedges, were presented a few years ago to the New York Lyceum of Natural History, being relics from the ruins of Palenque. In the collection of Columbia College are some razors, or sacrificial knives, the gift of the Hon. J. R. Poinsett.

Obsidian occurs massive, in roundish or obtuse lumps, balls, and grains; has a conchoidal fracture; is semi-transparent and translucent on the edges; it has a strong vitreous, and sometimes even metallic luster; its colors are either pure black, grayish, brownish, greenish-black, yellow, blue, or white, but seldom red; it sometimes displays a peculiar greenish-yellow shine, when it is called the iridescent obsidian; there is rarely more than one color in the same specimen with stripes and specks. Obsidian scratches white glass indifferently, but is scratched by topaz; its streak-powder is white; it has a specific gravity of 2·34 to 2·39. Obsidian is sometimes magnetic, so that small pieces show their magnetic poles. Before the blowpipe, the black variety is fusible with much difficulty; and even at a white heat it does not melt into a solid glass; but the gray and brown variety (marekanite) swells readily into a spongy mass.

Obsidian consists of silex, alumina, with a little potassa, soda, and oxide of iron.

The names, Iceland agate, lava, black-glass lava, volcanic lava, are all synonymous, and the mineral called bottle-stone, in round grains of the size of a pea, is nothing but a green obsidian.

Obsidian sometimes forms the cement of whole mountain chains, often forms deposits in the trachyte and the streams at the foot of some volcano; also among the volcanic ejections, and occurs in loose lumps in the sand of rivers, and at the foot of mountains. It is found in Iceland, Teneriffe, the Lipari Islands, Peru, Mexico, Sicily, Hungary, Asiatic Russia, the Ascension Islands, and on all the volcanoes of former and present times.

In the New York Lyceum of Natural History are several interesting specimens, presented by Don Correa, of Tabasco, from the ruins of the city of Palenque, such as concave or triangular wedges, and other masses of obsidian, from various localities.

It is employed for several useful and ornamental purposes, such as the making of ear-rings, necklaces, brooches, snuff boxes, knife handles, etc. It is particularly worn as mourning jewelry; it requires, however, much care in working, being extremely brittle. It is ground on lead wheels with emery, and polished with rotten-stone. It is kept in favor by the jewelers, on account of its high polish; but its value is very indifferent, excepting that of the iridescent obsidian, which commands a high price, and is sometimes seen cut in cabochon, and set in rings.

There is no doubt but that obsidian is of volcanic origin, being mostly found in the neighborhood of volcanoes, and that it is a glass, produced by volcanic fire, as it is a combination of silex and alkaline substances. The Neptunian theorists have endeavored to prove that it is occasionally found with the remains of decomposed granite, gneiss, and porphyry, with which it even alternates in layers.

FISH CULTURE.

BY CHARLES J. ATKINS.

Nearly all of our common fishes are *oviparous* which term, as distinguished from *viviparous*, we may apply to those species of animals which are reproduced by eggs laid in an undeveloped state. In most cases not only are the eggs extruded from the female fish before their development, but also that contact of the male element which impregnates them, and without which no development is possible, is effected after extrusion.

The operation of spawning, or depositing and impregnating the eggs, as performed by the parent fishes, is essentially as follows. At the spawning season, mature fishes of both sexes repair to a suitable locality; and, having selected a place, a female extrudes her eggs, which sink to the bottom among the pebbles, or, if glutinous, adhere to sticks, weeds, and stones. At the same time, or immediately afterward, the male emits the milt, the fecundating element, which, diffused through the water, comes in contact with the eggs and impregnates them. In due time, nourished by the water in which they are deposited, and quickened by its heat, they develop and hatch into living fish.

Now a little examination into circumstances will make it evident that a great waste must here occur. A multitude of greedy creatures hover around, ready to devour the eggs as soon as they are left by the parent, or are swept within reach by the current; a portion fails to come in contact with the milt; others are destroyed by noxious sediment or parasitic fungi, or buried deep beneath the shifting sands which the floods may bring down upon them. Should a portion of the eggs escape these dangers, the newly-hatched and defenceless young are eagerly hunted out by all the carnivorous tribes of the water. In the end, comparatively few of the eggs laid result in mature fish; it is perhaps impossible to ascertain the proportion with precision, but one per cent, would be far more than sufficient to maintain and increase the numbers of any species, so enormously fecund are they. Indeed, a rough calculation shows that were one per cent of the eggs of a salmon to result in full grown fish, and were they and their progeny to continue to increase in the same ratio, they would in about sixty years amount in bulk, to many times the size of the earth. Nor is the salmon among the most prolific species. I have counted in a perch (*Perca flavescens*), weighing three and a half ounces, 9,943 eggs; and in a melt (*Osmerus viridescens*), ten inches in length, 25,141. Some of the larger fishes produce millions at each spawning.

Now if in some way the eggs can be protected from these various dangers that threaten them when abandoned by the parent fish to the ordinary course of nature, it will at once be seen that a great gain will be made in the number hatched from the spawn of each mother; and if, farther, the young fish can be protected from their enemies until they have acquired size, strength, and agility sufficient to care for themselves, another gain will be thus effected. These two problems are among the most important with which Pisciculture has to deal, but have, we think, been satisfactorily solved.

An interesting experiment was made in Sweden in 1761, by Charles Frederick Lund. He obtained some breams, perch, and mullets, with mature spawn, and placed them in large submerged or floating wooden boxes, in which he had placed quantities of pine boughs. In these boxes the fish were kept several days, until they had completed the process of spawning; they were then removed. The eggs had adhered to the boughs. These species hatch quickly, and in a short time multitudes of young fish emerged from the boughs. In this way he obtained from fifty female breams, 3,100,000 young; from one hundred female perch, 3,215,000 young; and from one hundred female mullets, 4,000.000 young. These are certainly wonderful results. They were placed in the Lake of Rexon, and dismissed to care for themselves. In a similar way those species, like the trout, whose eggs fall free from each other to the bottom of the stream, may be made to spawn in places where it will be convenient to protect them by enclosures from marauders; and, with a suitable arrangement of small ponds and streams, the young fry of all species may be separated from the old ones that would devour them.

But the crowning discovery in Pisciculture was that of artificial fecundation. This discovery was made during the last century, but was turned to no practical account, and and was hardly practised except in laboratories, when it was re-discovered in France a few years ago, under circumstances that brought its economic bearing prominently before the attention of learned men.

Since the operation of extruding the eggs and milt is essentially mechanical, it can be as well performed by man as by the fish, and, once extruded, the milt performs its own office upon the eggs, and fertilizes them, with no other interference than suffices to bring them into contact. Nay, man can do better than the fish: he can express the eggs into a vessel where none of them will be swept out of reach of the milt, or into the maws of the expectant throng of bystanding fishes; he can then press the milt into the same vessel, and, by stirring them together, insure that the milt shall reach every egg. This is artificial fecundation. But let us examine the method employed.

The operations of Pisciculturists, who have practised artificial impregnation, have been mostly confined to a few species of the family of Salmonidæ. The processes pursued will therefore apply only in a limited extent to the members of other families.

Perhaps salmon and trout have received the most attention. Both these species always seek, running, shallow water, and spawn in the autumn or early winter. A female and male, both ripe and ready to spawn, seek a proper place, and on a gravelly bed, swept clean of sand for a small space, the female deposits her eggs, and the male his milt. The operation is described with great minuteness by European writers but I think that our brook trout (*Salmo fontinalis*) has not been observed sufficiently to ascertain whether its habits are precisely those of the European trout.

All fishes, when spawning, are so intently engaged upon it, that they take very little notice of anything else. Trout can be captured with the greatest ease at this time—not unfrequently they can be taken with the hand. The following is the artificial process as described by a practical breeder of the brook trout.

The trout, male and female, must be taken with a net, or in some manner that will not injure them, just at the time they are preparing to spawn, and placed in baskets standing in the water in some convenient place. A pan or pail with three or four inches of water in it is brought near the baskets containing the trout. All things being ready, a female trout is taken out of the basket with one hand, and with the other the abdomen is gently rubbed from the gills downward, whereupon the spawn flows in a continuous stream into the vessel. The rubbing is continued until the spawn is wholly extruded, and the trout is then quickly replaced in the water. This operation must not continue more than one minute if possible. On one side of the egg is a small white speck; this is where the impregnation takes place. This side of the egg being lightest, it always falls uppermost. A male trout is now taken, and in like manner the milt is expressed; it falls through the water and settles upon the eggs. All the trout in the baskets are served in the same manner. The spawn and milt are then placed in shallow vessels, and deposited in water, where they are allowed to remain an hour more. (Other operators find a few minutes sufficient to insure impregnation, and at the end of that time rinse the eggs thoroughly.)

The manner of proceeding with salmon and other species is essentially the same.

The eggs, being thus artificially impregnated, may be deposited in a natural stream, under circumstances as closely as possible resembling those chosen by the fish, and left to themselves; or, as is far better, they may be subjected to artificial hatching. By this they may be guarded from various mishaps, the supply of water can be so regulated that it will be uniform, and the eggs can be examined from time to time, and dead and diseased ones be removed before they can injure their neighbors.

It is essential that the incubation be conducted under circumstances like those under which it naturally takes place. The temperature, quality, and state of the water are the main conditions. Some species spawn in fresh water, and some in salt; some in rapid streams, and some in lakes and ponds; some in winter, and some in summer. The temperature required by trout is about forty one deg. Fahrenheit, ranging, however, from several degrees below this, to about fifty deg. while some species of summer-spawning fish require a temperature higher than sixty degrees. The time required for development varies with different species, and is much affected by temperature. Some species hatch in five days, while the trout is rarely less than fifty days, and at thirty-seven degrees of heat requires one hundred and thirty-six days.

The apparatus employed in artificial incubation is of various kinds. A metal box, with many holes to admit a free circulation of water, was one of the first employed; this is immersed in the water. Troughs of stone, vessels of earthenware, willow baskets, and wooden boxes have all been used in the incubation of salmon and trout.

A favorite form of hatching box for trout is a long wooden trough, its bottom inclined sufficiently to cause a gentle flow of water through it, and covered with a layer of gravel; the whole covered in by a lid. The eggs are deposited in the gravel or sand, and a stream of water, an inch or two deep, led through the trough.

At the French Piscicultural establishment at Huningue, and the Stormontfield salmon-breeding ponds, the hatching apparatus consists of a series of horizontal troughs, arranged side by side like the steps of a stairway, through which a stream of water falls in succession from the uppermost.

After the eggs are deposited in the hatching-boxes, a proper supply of pure water must be kept up until they hatch. They must be frequently examined to remove diseased eggs, and guard against the collection of sediment. It is better that they be kept in darkness, for light encourages the growth of a parasitic fungus.

When trout hatch they have still a large portion of the egg attached to the abdomen; that is gradually absorbed, and while it remains they require no food. It is the "yolk-sack." Upon its complete absorption the young trout begins to feed, and must be placed where he can find his own food, or must be regularly supplied with such as is adapted to his infantile condition, and will attract his attention, and tempt his appetite.

The whole process of producing fish, by artificial impregnation and incubation, is in practice remarkably successful. More than ninety per cent of the eggs become living fish. Mr. Ainsworth, the authority quoted above, has this year obtained twenty thousand trout from twenty-one thousand eggs, being more than ninety-five per cent.

In another point of view this process is of vast importance. It facilitates the transportation of species from one water to another. Salmon eggs, fecundated, were carried from Scotland to Australia in 1865; were successfully hatched in the River Plenty; and, having returned from their first migration to the sea, may now be considered as established there. In a similar manner the Merrimac River has been sown with salmon eggs brought from New Brunswick, and a harvest may be expected therefrom.

The rearing of fish in artificial ponds and reservoirs, and then bringing them into marketable and eatable condition by regular and systematic feeding, has been successfully carried out, and it is found to be quite practicable as an industrial occupation, bringing better returns, when trout are reared, than the growing of any other kind of animal food. Yet to determine with certainty what are the conditions of success in this branch of Pisciculture requires further experiment.

Pisciculture is not a new art. It was practised among the ancient Romans; yet not as an industrial pursuit, but as a source of amusement to men of wealth and leisure, or to supply with delicacies the tables of a gluttonous nobility. In Catholic countries, since the establishment of monasteries, fish preserves have been commonly attached to those institutions, to supply the devotees with food during their frequent religious fasts. There is no reason, however, to suppose that they had any knowledge of artificial impregnation. In China, it has long been an important branch of industry, and although we know very little of the process that they employ, it is certain that they succeed in making fish an abundant and cheap article of food.

Since the awakening of the public mind to this subject in Europe, government establishments have been put in operation in France and Germany, and private operations of great importance have been carried on in the British Isles. It is thought that primitive abundance may be restored to their now exhausted rivers, and not many years hence an acre of water shall be made to produce as much food for man as an acre of land. In America many persons have engaged in pisciculture as an experiment, and some attempts have been made to carry it farther; but as nothing has been done on a large scale, no great results have yet been attained.—*American Naturalist.*

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

What are the Comets?

Messrs. Editors:—It seems that as yet no satisfactory explanation has been given about these mysterious heavenly bodies. After seeing the article in No. 6 of the present volume, I beg leave of presenting herewith my hypothesis, which I have developed during many years past. and by which all known phenomena can be explained in a more satisfactory manner than by any other hypothesis.

The comet consists of gaseous matter which by the force of gravitation is formed into a perfectly round sphere. This sphere is of much greater dimensions than is generally supposed. The tail of the comet represents only the radius of the whole sphere; it is the visible part of the gaseous matter, while the rest of the sphere is perfectly transparent and consequently invisible to our eyes.

On its solitary travel through the space of our stellar system, and in consequence of the loss of heat by radiation, this sphere of gaseous matter is in a state of condensation and has the appearance of a cloud or of a sphere of mist. But as soon as it approaches our planetary system and becomes visible to our eyes, it comes under the influence of the caloric rays of the sun, by which the misty or cloudy matter is reduced to a perfectly transparent gas, and thus becomes invisible. Only the more dense mass that is collected around the nucleus, withstands the action of the sun's rays and thus remains visible as the head of the comet. On the opposite side from the sun, that portion of the gaseous matter which is shaded or protected by the head against the caloric rays of the sun retains its cloudy or misty appearance by which it is visible to our eyes as the tail of the comet. This tail is in perfect equilibrium with the rest of the invisible gaseous matter that forms the sphere; it is in fact a cloud in the shape of a column within a large sphere of a perfectly transparent gas.

Based on this hypothesis I can explain all known phenomena in relation to comets in such manner that no scientific man could contradict me. But it would make a book to represent my hypothesis in full in all its details, and I could hardly expect that so much of the valuable space of this journal could be devoted to one single subject. I wish to add only a few words.

Against this hypothesis perhaps the objection might be raised, how could such a great sphere of gas pass our planetary system without a collision, or without causing some great catastrophe upon our planet, the earth? As an answer to this I would refer only to an article in No. 2 of Vol. XIV., new series, of the Scientific American, which contains a

report of the passage of the earth through the tail of a comet. The earth has probably many times passed through the sphere of gaseous matter of a comet without any perceptible effect. This gaseous matter being so extremely rare and of such a nature as not to produce any essential change in our atmosphere.

The least satisfactory explanation has as yet been given about the transparency of the nucleus of a comet which allowed the light of a fixed star to pass through without any perceptible diminution of its brightness and without refraction. How is this possible? The gaseous mass that forms the comet is a mixture of different gases; some permanent gas or gases mixed with a condensible vapor, something similar to our atmosphere mixed with the vapor of water. Under the immense pressure of such a great sphere of gas, it is compressed at the center to such a degree of density, so as to float the liquid which results from the condensation of the vapor. This liquid forms an ocean floating upon a certain stratum of compressed air Thus it forms but a thin bubble, and is not only transparent but it will also not refract or change the straight line of the rays of light that are passing through it.

J. G. KONVALINKA.

Astoria, L. I.

Mills for Grinding Hydraulic Cements.

MESSRS. EDITORS:—I will briefly give a description of what I consider the best kind of mills and millstone dress for hydraulic cement. I will also give the titles, and names of the authors, of the best works in the English and French languages, on the art of lime burning, and general management of cement.

In these works the methods of preparing the lime prior to coming to the mill, and after going from it, seem to be exhaustively treated; but there is little or nothing as to how it should be crushed and ground—a most important part in the making of good cements. At present neither the build of the stone or the dress is suited to such work. Flour mills are brought to a very high state of perfection. A millstone built on the same style they are for grinding wheat is not at all fit for grinding cement. The eye of the stone should be at least sixteen inches diameter, or similar to Mullin's Ring Millstone. The balance-ryne should be semicircular (old style), with chambers in the lugs for the driver to work in. However good in theory, it may seem to drive a stone near its center, all millers of varied experience know that a stone driven near its center wears down rapidly around the verge, leaving the center high. Under the most favorable circumstances, a stone which grinds cement wears out of "face" very fast, and is much more difficult to be kept in proper order than a stone for grinding wheat. If the cement is not ground fine and even, it is not much better than sand, unless it is by itself. When not to be mixed, it should not be ground fine; when to be mixed with sand or other material, it should be as fine as possible. In all cases, but especially with some kinds of rock that cannot be evenly burnt, the cement should be bolted. A bolt ten feet long and thirty inches in diameter, covered with wire cloth, would in all cases make an even quality of cement. What would not pass through the wire could be returned to the stone again. It takes a greater quantity to fill a barrel when coarse than fine. It should always be ground while there is a *little* heat in it, as it takes less power and makes better cement.

As old stock French Burr is best for grinding wheat, so it is best for cement. It should be as hard and free from pores as possible, the hardest block or blocks around the eye of the stone. A stone four feet six inches diameter (the best for cement) should be divided into sixteen parts, with two furrows to the part. The lands should all be of equal width at the verge and tapering inward. The furrows should be an inch and a half wide and about three eighths deep at back; There should be a cast iron stand for the concave, with four legs obliquely set. It could be bolted to the floor. The concave need only bear in the stand at top and bottom. The crusher shaft should have an oil cup, set screws, and center lift, like a millstone spindle.

The best works on cement, etc., etc., are, "Observations on Limes, Calcareous Cements, etc.," by C. W. Pasley; "Practical Treatise on Limes, Cements, etc.," by Major General Q. A. Gillmore; "A Practical Treatise on Calcareous and Hydraulic Limes and Cements," by J. G. Austin; "Recherches sur la Chaux," par Vicat; "L'art de Calciner la Pierre Calcaire," par Hassenfraz; "Mémoires sur les Chaux et Ciments," par Treussart: "Recherches sur la Chaufournerie," par Petot.

JOHN O'CONNELL.

Louisville, Ky.

The "Dunderberg."

MESSRS. EDITORS:—Will you be so kind as to permit me to make a suggestion or two on the remarks of your correspondent in your issue of Aug. 10th on the *Dunderberg*.

The armor of this vessel is as follows: 4½ inches on casemate backed by 40 inches of wood, for the most part soft pine. Such a protection, as scores of experiments incontrovertibly prove, is easily penetrable by ordinary naval guns of medium weight and caliber. This armor inclines 30 degrees from the perpendicular; so small an inclination is not sufficient to materially increase its impregnability with respect to a shot striking it exactly horizontally—and shot never strike in that way—while at distances requiring a moderate elevation the inclination is just about sufficient to cause it to strike the armor perpendicularly. The side armor below casemate of the *Dunderberg* is composed of 3½-inch slabs laid on a backing composed almost wholly of soft white pine. This very thin iron is easily penetrable by shells, a shell passing through the iron, lodging well into the wood and there exploding, would make awful work. It would explode in every direction, inside as well as outside, and without doubt tear a hole in the vessel. My long experience with shells and their terribly destructive effects when they lodge and explode convinces me that the designer of this vessel has made a grave mistake in planning the armor. But then it should in justice be added that this was designed in 1862 before the now common powerful ordnance was fairly introduced, and when all naval officers, except a few who are always a little ahead of the times, regarded these heavy guns as delusions.

The gun deck of the *Dunderbery* was not constructed to carry fifteen-inch guns; it was originally intended to carry these guns in turrets on top of the casemate, when this plan was abandoned and it was decided to carry them on the gun deck, a gun carriage and compressor had to be invented to carry them. This was very successfully accomplished, but trials demonstrated the important fact that the gun deck was by far too weak to withstand the tremendous strain put upon it by the fifteen-inch guns. Those familiar with heavy ordnance will understand the reason when it is stated that this deck is composed of 4½-inch soft white pine planks laid on beams some 36 inches asunder. Doubtlessly a sufficiently strong deck can be put in.

Your correspondent makes a very grave mistake when he says the *Puritan's* armor is composed of 6 1-inch plates. This armor is made of 6 inch plates over 4½-inch solid slabs extending below the water line and laid on a backing of 48 inches of oak fastened to the iron hull fifteen-sixteenths of an inch thick. The armor is not so thick under water but it extends four feet below it, and accurate diagrams show that a shot fired in a direction at all horizontal must pass through from 18 to 20 feet of water before reaching the hull, a distance far more than sufficient to absorb its force.

The remarks of your correspondent on the jamming of turrets, etc., are evidently made without a proper knowledge of the facts. Service in front of Charleston in the iron-clads enable me to speak advisedly on this subject. The only case of jamming was when the iron-clads were fresh from the manufacturer's hands, when Dupont made his attack. This jamming was not only of a very temporary character indeed—it only occurred to one or two turrets—but it was speedily corrected and did not in my recollection occur again during the awful pounding these little vessels received for two years—a pounding to which that received in the first attack was as nothing.

With respect to the 15-inch gun, your correspondent does not do wisely in seeking to underrate its capacity in view of the well-established facts in relation to its great power against armor, particularly the late trial with this gun in England.

AN OLD ARTILLERIST.

Boring Through Trees to Increase their Fruitfulness—How to Exterminate Thistles.

MESSRS. EDITORS:—In No. 3, current volume, I read an article under the caption, "Boring Through the Heart of Trees." Without doubting that the boring produced fruitfulness, I would say that it is a fact long established that whatever hinders growth promotes fruitfulness, (that is, anything that does not deaden the tree), and *vice versa*. The practice of dwarfing trees has been universal, or near enough so to have school children understand that it is the object to diminish growth to produce early fruitfulness. The tree alluded to as having a mortise 18 or 20 by 4 inches, through the tree, must have hindered the growth of the tree, and by so doing promoted fruitfulness. Sulphur placed in a hole bored in a tree, if it helps to check the growth of the tree, will increase its fruitfulness. If sulphur were needed as a constituent part of the tree, why not place it in the ground at the roots of the tree? If a physician were to cut a hole into a man's stomach to place medicine in it, what would be thought of him?

Many years ago I heard it said that the cutting of Canada thistles in the full of the moon in June and again in the full of the moon in August, the same season, would kill them. The idea carried was that the particular phase of the moon killed them. I cut them as aforesaid, and it killed them. I was not inclined to yield to whims or superstitions, and searched for the cause. I found that at certain times of the year, or at least that there were times of the year when the thistle was hollow, and the cutting of them at any time while hollow, would kill them, simply because the rain would fill them with water and cause their decay.

A. K. S.

Nebraska.

Views of a Scientific Englishman.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of July 13th I observe a description of "Rider's Geometrical Plow." For more than twenty years we have built plows on the principle which Mr. Rider now brings before the public as new. At page 31 of our trade catalogue, sent by this post, you will find the words, "The breasts [mold boards] are made upon exact geometrical principles." These words have appeared in our catalogue for upward of twenty years, and our plows have for a like period been constructed, not by "rule of thumb," but on principles well ascertained and defined.

I often observe in your valuable paper illustrations and descriptions of machines launched as new inventions, which are simply repetitions of what we in England have produced many years before. The world is undoubtedly indebted to America for a great variety of useful schemes, but I have often been surprised at the want of knowledge displayed by your machinists on the history of English inventions. When perfect free trade is established between the two countries, this will pass away, and the mechanical progress in both will be wonderfully accelerated. By her restrictive policy, America repels foreign inventors. English manufacturers have the world before them, and so far as the manufactures of machinery are concerned, they go to countries to introduce their productions where they are not hampered with heavy protective duties.

Notwithstanding the acknowledged fact that America is a "go-ahead country," political economy does not at present appear to take deep root. Remove the barriers to free intercourse in trade, and both countries would be immensely benefited.

In one of your articles of July 13th, on "Rights of Property," are the following words:—"The aim of law is to benefit the whole people. Laws which burden the masses but fatten the few, should never be perpetuated." No more apposite remarks could be penned upon the principle of taxing the public for the advantage of a few producers.

JAMES HOWARD.

Bedford, Eng.

[Mr. Howard is the senior partner of the celebrated firm of James & Frederick Howard, whose establishment at Bedford, Eng., for the manufacture of agricultural machinery, is one of the most perfectly organized and extensive of any in the world. Mr. Howard is vigorous, progressive, and liberal in all his ideas.—EDS.

The Emperor Napoleon's First Grand Prize to America.

MESSRS. EDITORS:—Your Paris correspondent of July 3d mentions, among the award of grand prizes at the Exposition, one to "the mills of Chapin, at Lawrence, Mass." As this statement of an important prize is incorrectly given, I would be pleased if you will give your readers the following explicit account. The Emperor Napoleon proposed a distinct award of grand prizes, ten in number, of ten thousand francs each, "in favor of persons, establishments, or localities which, by a special organization, or special institutions, have developed a spirit of harmony among all those coöperating in the same work, and have provided for the material, moral, and intellectual well-being of the workmen."

There were 500 candidates for these prizes; 200 from Great Britain alone. Of the 500, twenty received honorable mention, in addition to the ten who gained the prizes; the second prize in order of merit, and the first to the United States, was to "Mr. Chapin, of Lawrence, for a well-conducted factory." Mr. Chapin represented the Pacific Mills corporation, of Lawrence, the largest of our New England manufactories, producing cotton, cotton and worsted, and worsted fabrics.

The Pacific Mills is well known throughout this country and abroad by its variety of popular fabrics, and in this department it confessedly holds a first rank. The Emperor's prize, however, was awarded it for its complete and successful system, in advancing the well-being of its operatives, by its library, lectures, and various benevolent societies connected therewith, and in promoting their physical condition by excellent sanitary regulations. It is gratifying to Americans, particularly, to know that one of our leading manufactories should obtain a grand prize of such value, when the factories of the world were competitors.

C. M. S.

New York city.

[The Pacific Mills, at Lawrence, Mass., is probably one of the most complete as well as most extensive in this or any country. It is, therefore, a matter of national as well as local pride that of the ten grand prizes, for the merits enumerated in our correspondent's communication, given, we believe, from the Emperor's private purse, one should be awarded to an American concern. No less than five hundred applications were made for one of the ten prizes of $2,000 in gold intended for this class, and one of the ten which were honored by success was a Yankee corporation.—EDS.

A Chance for Inventors.

MESSRS. EDITORS:—I have been struck with the great waste of valuable material that is permitted on the sugar plantations of Louisiana. I refer to the cane after the juice has been pressed out, and which is known as "bagasse." I do not know any reason why this material could not be used in the construction of paper; yet I am not aware that this substance has been experimented with in order to prove its utility. It can certainly be procured and prepared much cheaper than bamboo, and it has such a suitable fiber for the purposes above named that it is a wonder such vast quantities have either been burnt up or allowed to rot in heaps about the sugar houses. With the hope that this matter may attract the attention of enterprising men, I subscribe myself,

J. T. PAYNE.

New Orleans, La.

A Dental Improvement Wanted.

MESSRS. EDITORS:—I wish that you would suggest to inventors through the medium of your paper that they study on some way of affixing white enamel to the face of gold filling in teeth. I am confident that a fortune is awaiting somebody in that line. I will pay $100 to-day for a permanent enamel on my front teeth. They are filled on their face.

HOMELY TEETH.

A Small Invention Wanted.

MESSRS. EDITORS:—We mechanics who work in shops are much in need of a light paper hat or cap, neatly made of paper, pinked about the crown with holes conveniently cut for ventilation. A cheap article of this description is much needed and will sell well. There are over one hundred and fifty wanted in our shop.

JOHN A. FIELD.

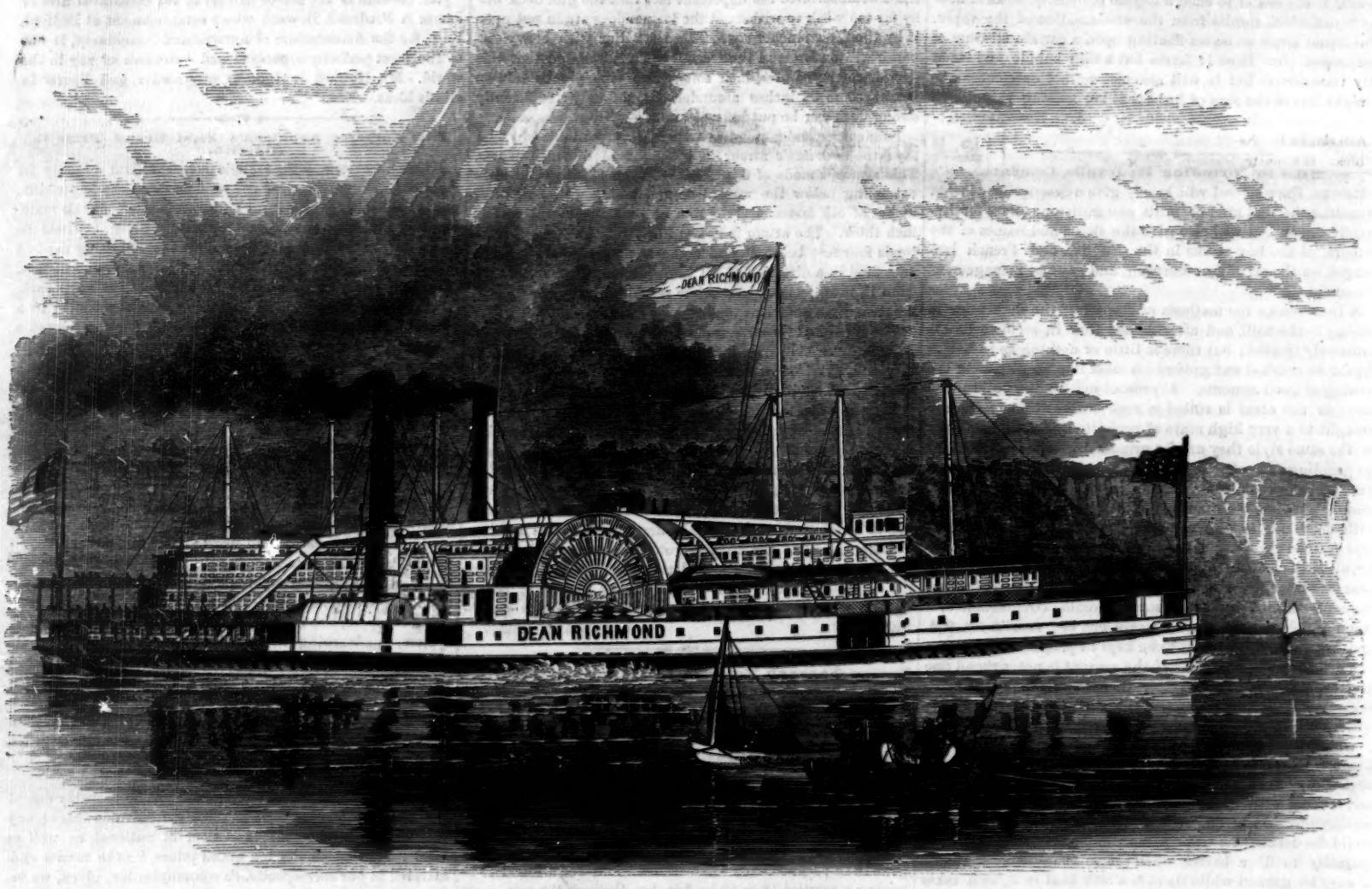
Racine, Wis.

MERCHANT FLEETS.—In her mercantile tunnage, Great Britain leads the world, with seven millions tons. Germany far exceeds France on this score, being third on the list. In the year 1860 the United States had overtaken England, and stood as the first commercial power in the world. The four years of war sadly reduced her merchant fleet, and now she ranks second, with five millions registered tunnage.

The Hudson River Steamboats.

The Mississippi River has given its name to a class of boats well known on all the Western waters from Pittsburgh to New Orleans. They are simply a shallow boat or scow on which are erected successive stories of saloons. Many of them are magnificent in their fittings and appointments, and all of them are convenient and comfortable. So at the East we have a class of boats deriving their distinctive name from the Hudson or North River. They are stanch, elegant in decoration, and some of them immense in size. Among the finest may be mentioned the *Dean Richmond*, the subject of the engraving—which is from a drawing by the artist Bonwill—the *St. John*, and the *Drew*. Our engraving gives a very correct view of the *Richmond*, and will convey to our country readers an accurate idea of the appearance of one of these river palaces. This boat plies between New York and Albany. She belongs to the People's Line, and cost $700,000. She has accommodations for 900 first-class and 600 second-class passengers. Her internal arrangements are of the best possible style, neither labor nor money being spared in her fitting up.

By means of these boats the poorest can have an opportunity of experiencing the delights of a trip on the most beautiful river of the country, and at the some time of enjoying the luxuries of a first-class hotel. Such vessels have done much to familiarize our people with the elegancies of life and to make them cosmopolitan in ideas and refined in tastes.



THE STEAMER "DEAN RICHMOND."

Science Familiarly Illustrated.

Musketoes—What They Are and How They Live

It is unscientific to say that musketoes bite, for they have no teeth; and they have no need of teeth to seize upon or prepare their food, for they are dainty, and take food only in the liquid form—spoon victuals. They are a chivalric race, and attack their enemies with a sort of sword or lance; no doubt they consider biting and gouging quite vulgar. The lance of the musketo is a very beautiful and perfect piece of work; it is smoother than burnished steel, and its point is so fine and perfect that the most powerful microscope does not discover a flaw in it. As the most delicate cambric needle is to a crowbar, so is the musketo's lance to the best Damascus blade. The lance is worn in a scabbard or sheath, which in every respect is worthy of it; it is often ornamented with plumes. Man carries his sword at his side, and the musketo on his head. The latter arrangement has manifest and wonderful advantages—the weapon is always *en garde*, and does not impede locomotion by getting entangled with the legs.

The lance and its sheath being on the head and being somewhat flexible, is often called a proboscis. This view of the case is strengthened by the fact that the scabbard is a suction pipe through which the musketo drinks its food. As Moses struck the rock with his staff, so the musketo with a thrust of his lance pierces the fountain, and the nectar, gushing into the scabbard, finds its way to the more sensitive and vital parts. But is not this calling the lance and scabbard a proboscis, thus likening the delicate musketo to the monstrous elephant, a little far fetched?

The musketo is the most musical of all animals. There is no bird which sings so much. He never tires of his simple song. How happy must he be, cheerily singing even far into the night! What a volume of melody from so slight a creature! if man had a voice as loud proportionate to his weight, he might hold a conversation across the Atlantic, and there would be no need of the telegraph. Linnæus, out of compliment to the musical powers of the musketo, named him Culex Pipiens. But there are those who say that the musketo has no vocal organs, and that his notes are not music, but the sounds produced by the flapping of his wings, or by some other similar and purely mechanical movement. Have these detractors music in their souls?

The musketo might be classed among our domestic animals, may we not say among the household pets? They are the almost constant companions of man in town and country during the holiday season of the summer. No home without the musketo. What affection! How they stick to us, closer than brothers! They often come a great way—hundreds of miles—to be with us. Most of those which greet us in this city have left their distant homes in Jersey and have made the perilous journey across a wide river. They also love their own society and travel in companies which sometimes comprise millions of individuals—in swarms which obscure the sun. But the common-place detractors say that musketoes are bred in unwholesome swamps, and that it is only the wind which bears them, as it does feathers and malaria, wherever it listeth.

Let us inquire about the earliest beginning of the musketo; let us take him in the egg. The mother musketo has notions of naval architecture, and out of the eggs she lays she constructs a well-modeled boat, with elevated prow and stern and well proportioned midship. For the boat she employs 250 to 350 eggs, building it up piecemeal, somewhat after the manner of men, binding together the individual eggs by means of a powerful water-proof cement, into a substantial and complete structure. Unfortunately we are unable to give a recipe for the water-proof cement; there are many who would like to have it. The boat is built on the water, and when completed she is confidently abandoned to the mercy of the wind and the wave. Thanks to that water-proof cement, she can neither be broken, wetted, or sunk; she is safer than if she were copper bottomed. The little craft, it must be remembered, is freighted with life—each of its 250 or 350 little state rooms has its tenant. After a few days cruising the occupants of the shells come forth, and the ship is destroyed. But those little creatures are surely not musketoes! They appear more like fish or serpents, or little dragons. On closer examination they prove to be what every one knows under the name of "wigglers;" they are the larvæ of the musketo. They wiggle about in the well-known way for a week or two, and after changing their skins two or three times, they assume quite a new form and movement. They are now what the boys call "tumblers," and are the *pupæ* of the musketo. In about a week, if the weather, etc., be favorable, something of the form of the musketo may be seen through the transparent skin of the tumbler. Shortly the prisoner escapes from his confinement as a full-fledged and bold musketo, and soars away in search of food and pleasure.

HOW MARL IS MINED IN NEW JERSEY.

The Squankum Marl Company has located its machinery for digging and hauling marl on a little stream about a mile from Lower Squankum. The whole of the ground they operate upon is laid under water. They have a large steam dredging machine, which will float in two feet of water, and will excavate to a depth of twenty-six feet beneath the surface, and to a breadth of forty feet at the surface of the water, and will discharge the material excavated at a hight of twelve feet above the water. A branch railroad connects with the Raritan and Delaware Bay Railroad at Lower Squankum. The track from this branch is laid along the margin of the pond, and the cars are brought up to be loaded directly from the excavator. In this way the water is to be made useful instead of being a hindrance. The machine is floated to the place where it is required, it is then set to work removing the top dirt, in the present work six feet deep, which is deposited in a bank along the margin of the pond. The track can then be brought up and the marl dug and dumped in the cars to be carried away. The work is very rapid, a tun of marl can be dug in a minute, and so powerful is the excavator that it gouges out the marl and deposits it in the cars as solid and almost as dry as when in the marl bed. Should this plan in its workings equal the expectations of its projectors, it will be a great advance on other methods in use. The machine, which costs about $10,000, is driven by a sixteen-horse engine, is operated by four men, and burns a cord of wood a day. When all is arranged, it digs about a tun per minute, and can probably do half of that for the day through, which would be three hundred tuns deposited in the cars in ten hours. An allowance must be made from this for the stripping, which may amount to from a quarter to a third as much as the extraction of the marl. The excavator is in successful operation, and can dig from six to eight thousand bushels (300 to 400 tuns) a day. Two locomotives and twenty cars are constantly employed in the delivery of marl, which is unloaded at any point on the line of the Raritan and Delaware Bay Railroad, or on boats at Port Monmouth, at 8 cents a bushel, or $1 60 a tun.

The following are analyses of the New Jersey marls from three principal beds:

Phosphoric Acid	1.12	2.65	3.73
Potash	5.80	6.81	4.98
Lime	11.67	1.04	4.15
Magnesia	1.97	1.81	.47
Oxide of Iron	16.93	19.80	18.70
Alumina	7.18	8.04	8.18
Silica	40.61	49.73	49.68
Sulphuric Acid	.70	.11	2.44
Water	8.10	8.34	7.87
Carbonic Acid and Loss	5.92	....	....
	100.00	98.33	99.70

We are indebted to Prof. George H. Cook, State Geologist of New Jersey for copies of his reports from which we take the above.

The Barlow Planetarium.

The accompanying engraving presents one view of our section in the great exhibition. The principal figure is Barlow's Planetarium, considered the most perfect and accurate ever constructed. It has received the approbation of some of the most distinguished mathematicians and astronomers. The United States Government has ordered two for the West Point and Annapolis academies. This apparatus presents all the movements of the sun and planets, exhibits the phenomena of conjunctions, transits, eclipses, etc., and by its indices and tables predicts their occurrence with perfect accuracy, showing the periods for the past as well as the future. The moon's phases, with the inclination and eccentricity of its orbit and those of Venus and Mercury are shown with perfect correctness. In short, the whole science of astronomy can be elucidated by the use of this instrument.

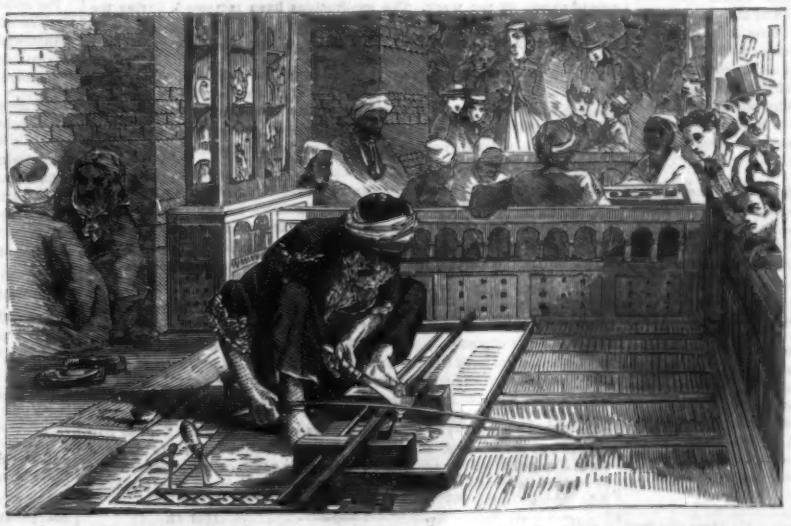
VIEW IN THE UNITED STATES SECTION, PARIS EXPOSITION.

Perfumes and Preventives of Moldiness.

An interesting paper on this subject has been published by Dr. Macculloch. We presume our readers are aware that moldiness is occasioned by the growth of minute vegetables. Ink, paste, leather, and seeds, are the substance that most frequently suffer from it. The effect of cloves in preserving ink is well known; any of the essential oils answer equally well. Leather may be kept free from mold by the same substances. The Russian leather, which is perfumed with the tar of birch, never becomes moldy; indeed, it prevents it from occurring in other bodies. A few drops of any essential oil are sufficient also to keep books entirely free from it. For harness, oil of turpentine is recommended. Bookbinders, in general, employ alum for preserving their paste; but mold frequently forms on it. Shoemakers' resin is sometimes also used for the same purpose, but it is less effectual than oil of turpentine. The best preventives, however, are the essential oils, even in small quantity, as those of peppermint, anise, or cassia, by which paste may be kept almost any length of time; indeed, it has, in this way, been preserved for years. The paste recommended by Dr. Macculloch is made in the usual way, with flour, some brown sugar, and a little corrosive sublimate; the sugar keeping it flexible when dry, and the sublimate preventing it from fermenting, and from being attacked by insects. After it is made, a few drops of any of the essential oils are added. Paste made in this way dries when exposed to the air, and may be used merely by wetting it. If required to be kept always ready for use, it ought to be put into covered pots. Seeds may also be preserved by the essential oils; and this is of great consequence, when they are to be sent to a distance. Of course moisture must be excluded as much as possible, as the oils or ottos prevent only the bad effects of mold.

Eastern Methods of Turning.

Not the least among the many advantages of the Paris Exposition is to be reckoned the opportunity afforded to witness the differing methods of doing work by the various peoples who represent their countries. In the East the most primitive modes of manufacture are still employed, and the dexterity of the workman is often as wonderful as the product of his labor is admirable. The East Indian, the Egyptian, and the people of many other Asiatic and African countries seen to have as much control over the movement of their toes as we of the West do over those of our fingers. They use them to grasp and hold tools, to pick up articles, and, indeed, for almost all purposes to which we apply our fingers.



AN EGYPTIAN WOOD-TURNER AT WORK.

The engraving represents a wood-turner from Egypt at work in the Paris Exposition. His lathe is a simple frame with two blocks as heads, on which are centers of metal. They are temporarily secured to the frame, but the blocks and centers can be moved together or apart and secured by means of a horizontal bar. On the centers is placed the piece of wood or ivory to be turned and it is rotated by the "bow," well known to our watch makers and repairers. The disadvantage of the bow is that it reverses the direction of the rotation at every stroke; of course the work is going on—the turning, drilling, etc.—only half the time, while the labor is constant. With one hand he works the bow and the other holds the turning chisel, while one foot presses the chisel to its work. Such a position is fully as uncomfortable as that of the tailor.

Electric Excitement.

The effect of solar heat, and its daily variation upon the dissimilar material of the earth, as well as a like action of internal fires, are, as we well know, fruitful sources of electric excitement. The vast and energetic actions by which the solar heat and light are maintained, involve among other things, as we have reason to believe, proportionate electric developments in that central source of power, which must in turn, by inductive action, affect our planet. In fact, such an effect may betraced in the most marked manner. Thus, Herschel, in his lecture on the Sun, says, as we shall here quote, simply premising that "sun spots" are believed to be only vast storm, cyclones, or tornadoes of the sun: "There occurred, on the 1st of September, 1859, an appearance on the sun which may be considered an epoch, if not in the sun's history, at least in our knowledge of it. On that day great spots were exhibited; and two observers, far apart and unknown to each other, were viewing them with powerful telescopes, when suddenly, at the same moment of time, both saw a strikingly brilliant, luminous appearance, like a cloud of light, far brighter than the general surface of the sun, break out in the intermediate neighborhood of one of the spots, and sweep across and beside it. It occupied about five minutes in its passage, and in that time traveled over a space on the sun's surface which could not be estimated at less than thirty-five thousand miles."

"A magnetic storm was in progress at the time. From the 28th of August to the 4th of September, many indications showed the earth to have been in a perfect convulsion of electro-magnetism. When one of the observers I have mentioned had registered his observation, he bethought himself of sending to Kew, where there are self-registering magnetic instruments always at work, recording by photography, at every instant of the twenty-four hours, the positions of three magnetic needles differently arranged. On examining the record of that day, it was found that every moment of time (as if the influence had arrived with the light) all three had made a thoroughly marked jerk from their former positions. By degrees, accounts began to pour in of great Auroras seen on the nights of those days, not only in these latitudes, but at Rome, in the West Indies, on the tropics within 18° of the equator, (where they hardly ever appear;) nay, what is still more striking, in South America and in Australia, where, at Melbourne, on the night of the 2d of September, the greatest Aurora ever seen there, made its appearance. These Auroras were accompanied with unusually great electro-magnetic disturbances in every part of the world. In many places the telegraphic wires struck work. They had too many private messages of their own to convey. At Washington and Philadelphia, in America, the telegraphic signal men received severe electric shocks. At a station in Norway the telegraphic apparatus was set fire to, and at Boston, in North America, a flame of fire followed the pen of Bain's electric telegraph, which, as my hearers perhaps know, writes down the message upon chemically prepared paper."

Such facts as these show a marked connection between disturbances of the sun, which might most naturally be supposed to involve electrical developments in that body, and electric conditions of our earth; and it is, therefore, in no wise unreasonable to suppose that atmospheric electricity may to a great extent, be due, directly or indirectly, to the inductive influence of the sun, aided in its effects by the evaporative actions above described.—*Prof. Henry Morton*

The Rodman Gun in England—Opinion of the "Times."

In our issue of August 10th we copied from the London *Standard* a report of the performances of the American 15-inch gun at Shoeburyness. The London *Times* has an account of its after performance and gives its opinion as to the comparative merits of our smooth-bore cast-iron system and the English rifled wrought-iron plan. We have no room for comments in this issue:—

"The gun was fired at a target commonly known as 'the 8-inch, with *Warrior* backing.' This target was erected for various experimental purposes, its strength being designed to just resist a 9-inch rifled gun, with steel projectile, and it was found to answer the purpose exactly. The only 9-inch projectiles which have penetrated it, have been Palliser's shells, at 200 yards, and they not always. The 10-inch gun, however, can conquer its resistance without the least difficulty. The 9-inch gun weighs 12 tuns, and throws a shell of about 250 lbs., with a battering charge of 43 lbs. of powder. The 15-inch American gun weighs 19½ tuns, and its shot ranges from 453 lbs., the weight of the cast-iron projectile, to 498 lbs., that of the steel shot. Its battering charge is 60 lbs. of American powder, equal to 50 lbs. of English powder. But the trial on Wednesday was not only that of a gun against a target, but of material for shot also, and the *Times* acknowledges that the American cast-iron shot proved itself to be excellent—not as good as steel, but better than any ordinary English cast iron that we are accustomed to see in projectiles. To give the gun every chance it was placed only 70 yards from the target. In the first round the blow took effect just at the lower edge of the upper plate, and, therefore, upon a rather weak portion of the construction. Nevertheless, the depth of the indent was only four inches, the hole measuring across 14 by 13 inches. The plate was buckled five inches at the deepest part, the total diameter of the portion thus bent being 40 inches. In rear, two ribs were slightly cracked and five a little bulged. The plate was not pierced, the backing was not reached, the skin was intact. For the next round a spherical shot of No. 6 Pontypool iron, cast in sand, and weighing 452.5 lbs. was painfully lifted to the muzzle of the gun and rolled down upon a charge of American powder similar to the first. This time the indent could not be measured, because part of the projectile remained in the hole, the rest being dashed to pieces, leaving the broken surface almost flush with the face of the plate. There was a horizontal buckle of 1·6 inches over 5 feet. No harm was done to the back of the target. The third round was fired shortly afterwards, an excellent shot of Firth's steel being employed. But it could not get nearly through the target. It hung protruding from the face of the plate, and when shaken out afterwards, by the blow of another shot near it, disclosed an indent of 6·2 inches deep. There was a buckle of 1·4 inches, diminishing gradually over a distance of 40 inches. Again, no serious damage was done to backing or skin; the side of the ship would have been firm still, and the men safe at their quarters. It was no part of the programme on Wednesday to fire a 9-inch shell directly at the target, as this had been done frequently before, and the results accurately taken; but one round was fired, and is worth noting, chiefly from the curious circumstance which has been previously observed, and that the effect of some of these projectiles has been greater at 200 yards than at 70 yards. Whether the metal was not quite so good, or whether, as is possible, the shot is steadier at longer range than at the shorter, certain it is that the penetration was only 19½ inches, and the hole made was greater in diameter than was due to the size of the shell. A 9-inch shell made a hole 11 inches in diameter, but not disturb the skin. The *Times* says: "Thus, then, we have gaged the power of the strongest American gun likely to be brought against us on any occasion, for excellent information from the United States leaves no doubt of the fact that there are but ten 20-inch guns made, and that only eleven rounds altogether have been fired from them. We find that the penetrative effect of the 15-inch gun is inferior to that of the English 9-inch rifled gun under circumstances the most favorable to the former. The American gun weighs as much as an English 9-inch and a 7-inch together, its life with battering charges is stated by the American military authorities to be very low, and if we compare it with the English gun nearest its own weight, the latter, though one and one quarter tuns lighter, would be driving every shell through the sides of an ironclad against which the smooth-bore could but rap beseechingly and without effect! Can any one doubt the issue of a combat between the two systems of artillery? The smooth-bores look very big and threatening, and can doubtless make a great noise when their shot strike the outside of a vessel; but the life of a ship is in its interior. Should we ever require heavy smooth-bore guns, the experience obtained in the long course of experiments and manufacture would enable us to begin where they left

off, and there is no reason to limit our ideas of possible wrought-iron smooth-bore ordnance under a caliber of 30 inches. If we desire to throw a heavy shot with a low velocity we can do so now by simply increasing the length of the projectile and decreasing the charge. So the English guns can 'rack' it if they wish, while the American guns cannot penetrate targets that may be easily pierced by rifle shot at high velocities. But, though the 12-inch shot did not get through the 8 inch plate, and backing, it would have penetrated most of our ships, though not as easily as our guns would have penetrated theirs. It is an easy matter of calculation, from data received on Wednesday, that the 15-inch American cast-iron shot would have been stopped by the *Lord Warden, Bellerophon, Lord Clyde* and ships of that class, but the steel shot would have penetrated all except the *Hercules* or *Monarch*, which are not yet afloat. This supposes a range of 70 yards, and a direct blow. At 500 yards, or at a slight angle, it would penetrate the *Warrior*, but not ships of the classes named above. It is for the Navy to say what protection they desire to have. The question of gun power may be considered as settled; only it must not be forgotten that the target fired at on Wednesday had been struck on previous occasions by more than 11,000 lbs. of iron, propelled by above 1,900 lbs. of gunpowder, the work done upon it being over 180,000 foot tuns."

Origin of the "Dollar Mark."

The new "Dominion of Canada" is exercised because the $ sign was not invented for its special use. A Toronto paper says: "It is suggested that the letter D be used for dollars in the Dominion instead of $, which is a contraction of the letters U. S. and stands for United States. The adoption of D is urged on the grounds that it is particularly appropriate as being the initial letter of Dominion as well as Dollar, and moreover, that it would show the currency meant, without any other distinctive mark. For example, $ would at once convey the idea of United States currency, and "Dominion Currency."

Where did the Canadian editor make the novel discovery that $ was a contraction for U. S.? It has generally been supposed to stand for the figure eight, and to mean eight reals, which was the Spanish dollar from which our coin was imitated. The two parallel lines were drawn across the "8" to distinguish it from the ordinary numeral.

There is another origin sometimes given to this design, which refers to the old pillar dollar. There were on that coin two pillars or columns connected by a scroll, and the $ bears a rude resemblance to this device.—*Evening Post.*

Editorial Summary.

ASTRONOMICAL OBSERVATIONS.—Prof. Safford, who has charge of the famous "Clarke Telescope," mounted in the Dearborn Observatory, at Chicago, in reply to an English astronomer's inquiries as to what had been done with this great telescope, writes that he has discovered about seventy new nebulæ, mostly small, with distinct nuclei; of these, one is triple, three in a row; one, a large, rather diffuse nebula, of singular shape, in Perseus; another is an irregular ring, known previously as a nebula, not as a ring. The nebula of Orion astonished him by its brightness and distinctness, and he has discovered a branch preceding the main nebula which has a roundish opening in its center. He is preparing to publish a report of his observations in full.

AMERICAN VOLCANOES.—In the Andes-Rocky-mountain chain, extending entirely through both continents, there are no less than fifty active volcanoes, the most interesting being located in South America. Those in the neighborhood of Quito are remarkable for vomiting forth enormous quantities of water and muddy substances, which fertilize the land to the extent of eight or ten leagues around them. The subterraneous noise of Cotopaxi extends to the distance of upwards of 500 miles. The reason why melted lava is not thrown out, is supposed to be the vast depth at which it lies. It frequently throws out filth from the crater, which is 2,500 or 2,600 fathoms above the level of the sea.

THE MANUFACTURE OF SHOES, it appears, differs according to the locality of the market for which they are destined. A broad shoe, wide in the shank is best adapted to the Eastern trade, a narrow sole meeting with little favor. The Middle States require smaller shoes and higher in the instep than the New Englanders. The instep grows higher as we proceed southward, and the foot shorter and more plump. While at the North a full grown man rarely wears less than a No. six, running upward as high as size No. eleven; at the South many men wear fours and fives, and seldom over nines.

AMATEUR ANTIQUARIANS, in towns on the London and Southwestern Railway, have been badly victimized by two sharp venders of what purported to be rare and valuable curiosities, which they had unearthed at Windsor. The relics were claimed to have been found in an ancient urn, and consisted of weapons, coins, spoons, and other articles of Roman or Saxon workmanship. The forgery was discovered by certain well-informed archæologists, and the principals engaged in perpetrating the fraud, were arrested. On examination, the specimens were found to be all modern-cast brass coated with a green oxidation to give them an antique appearance.

TEXAS PAPERS assert that the various patent processes for preparing beef for northern markets, by canning, infiltration, etc., have practically failed. By manufacturing ice on the premises, the atmosphere of rooms in which the beef is packed for transportation, may be kept so cool that the meat will not spoil during the operation. As the cattle are in the best condition for slaughtering during the warmest months of the year, the serious trouble heretofore has been that the beef spoiled before it took the salt, but the late introduction and use of ice machines has obviated this difficulty.

THE TENDENCY TO FERMENTATION in alcoholic spirits is so far diminished by heating the liquors above 115° Fah., that they may be kept for an almost indefinite period. The liquid must be raised to the required temperature rapidly, in a closed vessel, and cooled suddenly, being kept between 85° and 185°—the temperature most favorable to fermentation—for the shortest time possible. The higher the temperature the greater its preservative power, but the more it diminishes its fine flavor.

DENSITY OF OZONE.—M. Loret, of Geneva, experimenting to determine the density of ozone, by Graham's law, viz: that diffusion takes place inversely as the square of the density, diffused two mixtures, one of oxygen and chlorine, the other of oxygen and ozone. Thus compared, the density of ozone to that of chlorine or oxygen was as 1 to 6.

UNINFLAMMABLE FABRICS.—M. Kletzinski takes equal weights of sulphate of zinc, sulphate of magnesia, and sal ammoniac, mixed together in a mortar. The addition of three times the weight of mamouda clam produces a pasty mass which is to be carefully dried. To make light fabrics indestructible by fire, he uses one part of the above mixture with two parts of starch. This compound is much cheaper than tungstate of soda.

THE GREAT TUNNEL.—The cutting of this tunnel through the crest of the Sierra Nevada mountain chain has generally been looked upon as a three years' job, but the enterprising Californians made the attack at both ends, and then sunk a shaft in the middle down to the level of the grade and worked both ways. The total length is sixteen hundred feet, cut through solid rock Operations were begun in September, and since last June the rate of progress has been nearly forty feet per week. The 15th instant is the date fixed for the passage of the first locomotive. The rails are now being laid on the easterly slope, where twenty miles of the road is graded. It is confidently expected that the road will be completed to the Nevada line by September next, and as there are no serious obstacles to overcome for many miles beyond, the Californians feel sure of reaching Salt Lake before the Eastern division of the great work gets there.

THE TELEGRAPH in Switzerland being the property of the state, is probably managed better and more economically than in any other country throughout the world. The Federal Council have decided on further reducing the rates, already lower than the average of other nations, making the charge for telegrams sent for any distance in the country, uniform at 1 franc 50 cent., or about ten cents, for twenty words. The new rate is to come in force on the 1st of January, 1868.

A MUSEUM, which will be of great interest, is forming at the Springfield, Mass., arsenal. It will contain an almost endless variety of guns, American and foreign, federal and rebel, muzzle and breech-loading. A valuable feature will be specimens of the scores of breech-loaders which were presented to the Commission for examining such arms, which met in Springfield some time ago; also, photographs of every part of each. Of course war relics will comprise a prominent part of the collection.

VARIEGATED MARBLE.—To imitate any of the fine veined marbles an exchange advises to heat the solid block to be operated upon, so that its pores will be opened to receive the colors. These latter consist of an alcoholic solution of alkanet root, to produce a rich lavendar; madder lake to make a rich crimson; indigo a blue; verdigris, green; and gamboge, yellow. The several colors are to be tastily put on in the desired pattern, and will be rendered permanent by being absorbed in cooling the marble.

A SUBSTITUTE FOR PLASTER OF PARIS MOLDS.—Chloride of magnesium, it has just been announced, can unite and associate with magnesia, forming an oxychloride of magnesium perfectly insoluble, and possessing the property of taking all variety of forms, in a degree incomparably greater than plaster of Paris. It also is capable of taking a high polish of a great number of substances with which it may be mixed in the proportion of a fifteenth to a twentieth of their weight.

PRESERVING WINE.—In the process of fermentation air bubbles are formed in wines. For a long time scientific men believed these bubbles to be cells of a vegetable nature, but their true character being discovered, the owner of a French vineyard, by exposing his liquid for two hours to the action of a vacuum, has succeeded in removing them. The same result is secured by a treatment with heat, but this latter system is superior in many respects, and above all, is much more economical.

A VALUABLE SOUVENIR.—The fortunate wife of the happy Frenchman who imperilled his life in attempting to preserve that of the Russian Emperor, has been made the recipient of a necklace from the grateful Czarina, made of diamonds, the largest weighing ten carats, the others two carats each. The clasp is formed of a splendid sapphire, to which is suspended a locket surrounded with four rows of pearls and diamonds. The value of the whole gift is given at $80,000.

THE SANDWICH ISLANDS.—The native population of these islands is steadily decreasing, though more slowly than formerly. From 1832 to 1850 the decrease was nearly fifty per cent. The last census shows a population three times as many as it would have been had the former rapid rate of diminution continued. The increase of foreign population, during the last sixteen years, has been 117 per cent. Twelve hundred inhabitants from the Celestial Empire have constituted a portion of this foreign influx.

BEET ROOT SUGAR.—One establishment engaged in this manufacture in Germany has a capital of $16,000,000, employs 3,000 operatives, and occupies buildings which cover twelve acres of land. European makers annually dispose of 400,000,000 pounds. The importance of the attempts, in this country, to encourage this branch of industry is illustrated by the statement that during the year ending July 1, sugars valued at $39,595,977 in gold, were imported into the United States.

PATENTS.—An examination of the work performed at the Patent Office shows that the number of applications, at the present rate of increase, will reach 20,000 during the present year, and that patents are being issued at the rate of nearly 300 per week. The applications have increased, during the past four years, on an average of nearly 5,000 per year, while the means for facilitating business have not been added in a proportionate ratio.

CHOLERA AND POESY.—A French medical paper asserts that a working man, well advanced in years, living in Paris, was seized with a violent attack of cholera, in its worst forms. Up to this moment he had certainly never manifested any literary ability, but, after his recovery, he commenced to write poetry, and has already published quite a volume of poems of considerable merit.

WHITE LEAD.—A Parisian has patented a process for obtaining white lead directly from the ore, by pouring the molten metal into cold water to render it as porous and bulky as possible. He next dissolves it in sulphuric acid and the sulphate is treated with pyroligneous or oxalic acid, combined or not, with tincal dissolved in water, and next dried over the fire on stone trays.

MESSRS. LONGSHORE & BROTHERS, of Mansfield, Ohio, have sent us samples of their excellent household tool, in which is combined a tack drawer, a hammer, a pair of pincers, a stove-top handle, and we are not sure but something else that we have not discovered. All the housekeepers in our office have introduced the improvement with success. It is a good thing. Every family should have it. See illustrations in our paper for July 6th, last.

THE SNIDER RIFLE.—The arms, of all sorts, converted by the English government, on the Snider principle, up to the present time, amount to 200,000. A slight change has been made in the construction of the cartridge, with a view to cheapen its manufacture, while their efficiency has rather been increased than diminished thereby.

PROGRESS.—The monitor's 15-inch gun used originally only thirty-five pounds of powder. Since the war, a charge of one hundred pounds has been safely used; while at a trial of the 20-inch gun at Fort Hamilton, the charges were raised from one hundred and twenty-five pounds of mammoth grain powder, at the first shot, to two hundred pounds at the fourth shot.

COBALT AND NICKEL.—A German chemist has been conducting some delicate experiments with these two substances to determine their respective atomic weights. The mean of five experiments with cobalt gave the number 29·406. The mean of four with nickel, the number 29·57. The atomic weights may therefore be taken as identical, *i. e.*, 29·5.

QUININE ALE.—The British *Medical Journal* notices with favor the introduction of a new tonic wherein England's favorite beverage is made to do service in a medicinal way. The innovation consists in introducing one grain of quinine in an imperial pint of ale, the additional bitter element being considered a decided improvement.

WHILE SLEEPING with the head raised or bolstered up, the vessels through which the blood passes from the heart to the head, are lessened in their cavities; therefore, in all diseases attended with fever, the head should be nearly level with the body.

PASTIME AND POWER.—Philadelphians are amused over a rare mechanical combination whereby one can enjoy the pleasure of swinging, and, at the same time, by a wheel, cog, and treadle, attached to the swing, set in motion a churn, a wood-saw, a pump, or a washing apparatus, at pleasure.

THE SUBMARINE TELEGRAPH between Jutland and Norway is now in full working order.

THE SOURCE and exact length of the Ottawa river, the second largest river in the Dominion of Canada, has recently been determined by a party of explorers sent out by government in last March. The party went up the Du Moine to Gros Lake, which they, explored, and by governmental instruction re-christened Victoria Lake. Thence up the "Grand Prince of Waters," until it overlapped the head waters of the St. Maurice. Pushing on further in a little south-easterly direction, they found themselves fifty miles distant from the head waters of the Saguenay. Making friends with the Indians, the party proceeded in safety to its destination, discovering the length of the Ottawa to be one thousand miles. The land on these upper reaches is of the best quality but the climate is cold. The explorers reached civilization after spending four months and a half in the wilderness.

AN ARSENIC manufacturer, in Boston, died lately from the continuous infusion of the poison into his system during his long employment in manufacturing it.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The total loss by the late freshet on the upper Mississippi is now set down at $630,000, of which sum $14,000, was the loss on bridges. Forty million feet of logs were carried away, which were valued by their owners at $10 per thousand feet.

Professor Whitney, reports fifteen localities in California where diamonds have been found in the course at washings for gold, but in his view it would not pay to wash the gravel beds of those places solely for the precious stones for diamond washings are not profitable in any country except with slave or convict labor.

The report of a survey of a railroad between Nashville and Knoxville just been published in detail. The projected line is one hundred and nin miles long, and runs on a natural route along the western slope of the Cumberland Mountains, the steepest grade being ninety feet to the mile.

Gold mines are being rapidly developed in Virginia. This fall there will b seventeen in Spottsylvania, Culpepper, Orange and Louisa counties.

A party of Pittsburg speculators representing a capital of $2,000,000 are buying up crude petroleum for delivery at any time during 1868, at their option.

A stone sixty feet long, seven feet wide, and four feet thick, has been taken out of a quarry in Massillon, Ohio, by machinery. The specimen weighed one hundred and seventeen tuns.

A new nail factory is being put in operation in Dorchester, Mass.

Mr. John Garey of East Weymouth, Mass, spent the winter in England engaged in selling the Patent Right of the American nail machine.

Mr. Newell Marden is now in Birmingham putting up machines for the American Nail Company, of Fairhaven Mass.

The railroad Committee of the Connecticut Legislature, reported unanimously against granting a charter for a new road from New Haven to New York parallel to the existing road, which latter now enjoys a monopoly of all eastern travel, by rail from this city.

There are now taken out of the hills of Lebanon County, Pennsylvania, 15,000 tuns of iron ore per month. Two tuns of this ore make one tun of iron.

A competitive trial of speed between two locomotives, one manufactured by Borsig, of Berlin, and the other by Sigl, of Vienna, was made at St. Petersburg, on June, 30th. Each engine had to draw a weight of 600 tuns up an incline of 1 in 125. The Austrian engine made twelve English miles in an hour, and the Prussian only eight.

An exchange informs us of a locomotive on the Louisville and Nashville railroad, which has been in active service thirty months, running 90,000 miles without needing any repairs, and with every promise of increasing her mileage 30,000 more before going into the shop. This engine, considering the great wear and tear on our American roads, it thinks compares very favorably with the record of a French locomotive which, with a similar history, was entitled to a prominent place in the Exposition.

A New York geologist has discovered evidences of gold in the soil of Huntingdon Co., Indiana, one ton yielding $42 worth of the precious metal. A company has been formed and the necessary machinery purchased to commence operations at once.

Diamonds to the value of $3,250,000 are annually sent abroad from the port of Bahia, Brazil.

The India, China, and Colonial Telegraph company organized in England, propose laying a cable from Falmouth to Gibraltar, and thence, through the Mediterranean Sea, to Malta.

The mills are running at a loss in Lowell, Lawrence, and most of the other manufacturing towns in Massachusetts and throughout New England. The Manchester mills and print works have goods on hand unsold of the value of two millions of dollars. The same state of things exists with the Amoskeag Company.

The pioneer firm in the manufacture of the latest sponge now being introduced into all kinds of upholstery, is located at Birmingham, Conn. The company have over 500 hands employed in gathering the material, on the Bahama islands. The sponge is first subjected to a process which destroys its animal character, and completely deodorizes, and purifies it. A chemical preparation now serves to keep it from drying and shrinking, and the fibres remaining soft and retaining their full elasticity, are never known to pack like horse hair or moss. Moths will not approach the sponge. The company turn out about four tuns weight per week, and fill but one half their orders.

The Northfield Knife Company was started about twenty years ago, on the co-operative plan, by some "striking" workmen, who invested $5 each. The business has largely increased, and the proprietors are now independent.

The new railroad between Mount Holly and Camden, N. J., nearly completed, passes through one of the richest agricultural districts of that state, and must prove a pecuniarily successful investment. The road is to be extended eastward to Hightstown, where it connects with the Camden and Amboy track.

California now exports 10,000 tuns of copper annually, an amount five times as large as the whole production of the United States ten years ago.

Pennsylvania furnishes seventy-three and three fourths per cent. of all the coal produced in the United States.

The nickel mine near Lancaster, Pa., which has lately attained something of a notoriety, was worked a short period for copper, just about the time of the Revolutionary war. Nearly fifteen years ago a company of Philadelphia capitalists re-opened the copper mine, but the ore found was soon discovered to be very rich in nickel, a more valuable mineral, and since then the greater part of the supply for governmental coinage has been drawn from this source.

In Norway very successful results have been obtained with lines of railway of 3 feet 6 inches gage, the rails weighing but 40 lbs. per yard. Mr. Carl Pihl, the government railroad engineer, believes that still lighter railways of the same gage are likely to be yet constructed in that country, the rails weighing only 30 lbs. or possibly even 24 lbs. per yard.

The expansion of the rails of a railroad 500 miles long, amount in a hot summer's day to nearly a quarter of a mile, from the point of the extreme contraction in winter.

One of the most deplorable mining disaster on record occurred last month in the neighborhood of Lugan, in Saxony. By the accidental blocking up of the pit with an impenetrable mass of timber and rock, one hundred and two men working at the bottom of the mine were imprisoned and in spite of all attempts to rescue them, miserably perished from starvation or suffocation.

The shoe business at Lynn, Haverhill, Randolph, and other large shoe manufacturing towns in New England is said to be in a very low condition, as compared with what it has been in former years.

Utah comes in for her share in the gold discovery mania. Late advices from Salt Lake state, that forty ounces of gold dust were brought in from one of these acquisitions, which were crushed from the quartz in two days.

The Western railroad of Massachusetts in a few months will complete its second track, so that when this is done an unbroken line of double track will extend from Boston to Albany.

During the year 1863 the production of petroleum in this country was nearly 4,000,000 barrels, over one quarter of this amount being exported. Many companies formed during the oil excitement in that year have since allowed their lands to be sold for taxes, seemingly resolved to spend no more in that country, but the productive localities are so continually changing that many of these farms may again be brought into market. A decided increase in the amount of petroleum exported this year as compared with last, is noticed. The excess thus far amounts to 3,126,674 gallons, or 78,161 barrels.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

MACHINE FOR PREPARING AND REDUCING COCOANUTS.—John Gardner, Philadelphia, Pa.—The object of this invention is to prepare cocoanuts for the use of confectioners and others, and it consists in a horizontal revolving convex plate in which are placed, radially, a series of knives or cutters against which the cocoanut is pressed, and which cut it off in thin strips or ribbons. Immediately below this cutter-plate, is a series of radial arms which are made to revolve by the same crank which drives the cutters, but in the opposite direction, thereby dividing the strips or ribbons into very minute fragments. This invention also includes a device for removing the dark skin on the outside of the cocoanut.

PLOW WHEEL.—George Dodge, Kalamazoo, Mich.—This invention relates to a new and useful improvement in gage wheels for plows. The invention is applicable to all plows, but is more especially designed for those which are provided with iron beams.

CLAW BAR FOR DRAWING RAILROAD SPIKES.—Henry Jeffrey, St. Charles, Mo.—This invention relates to an improvement in the construction of a claw bar for drawing railroad spikes.

BELL.—Ezra G. Cone, East Hampton, Conn.—This invention relates to a new and useful improvement in bells, more especially in small bells, designed for doors, and commonly termed jingle bells.

ICE-CREAM FREEZER.—Wm. H. Skerrett, Cincinnati, Ohio.—This invention relates to an improved ice-cream freezer, and consists of a cylinder to hold the cream, disposed within another cylinder, of the same depth, in which the ice or freezing mixture is placed, the mouth of the cream cylinder being soldered in the bottom of the ice cylinder; both mouths are covered with wooden caps which may be made tight by an india-rubber, or other packing, and screw brace or tie.

LUBRICATOR.—Henry Jarecki and Charles Jarecki, Erie, Pa.—This invention consists in a new and improved arrangement of parts whereby the oil is filtered or strained as it enters the reservoir or chamber of the lubricator, and whereby the quantity of oil to be discharged is governed or controlled by a plunger and valve.

MILK-CAN BOTTOMS.—Moses Wiles and Joseph C. Wock, Fort Plains, N Y.—This invention relates to a new and improved method of constructing the bottoms of cans which are used for the transportation of milk, or dairy purposes, whereby they are rendered much more durable than when made in the ordinary manner.

STEAM PUMP.—Rudolph Schmidt, New York city.—This invention consists in constructing the steam and water cylinders in one and the same piece, forming two cylinders connected together, the piston and plunger of which are connected to and operated by one piston rod.

TABLE FAN.—W. A. McReynolds, Elkton, Ky.—This invention relates to an improved mechanism for operating a fan, designed more especially for keeping flies and other insects off from a table while meals are being eaten.

WASHING MACHINE.—James B. Coffin, Ashland, O.—This invention has for its object to furnish an improved washing machine, so constructed and arranged that the operator may stand erect and work the machine with both hands, and which will do its work quickly and thoroughly, whatever be the quality of the clothes being washed.

BROOM HEAD.—T. G. Packer, Mexico, N. Y.—This invention has for its object to furnish an improved broom head, simple in construction, easily filled, and which will hold the corn securely and firmly in place.

WINDOW SHADE FIXTURE.—L. A. Tripp, Middletown, N. Y.—This invention has for its object to furnish an improved fixture for window shades, by which the shade may be held at any desired elevation, and at the same time be free to be drawn down or to be run up, as may be desired.

WASHING MACHINE.—Miles S. Prentice, Rockford, Ill.—This invention has for its object to furnish an improved washing machine, simple in construction, easily operated, and which will do its work quickly and thoroughly, and without injury to the fabric.

LIGHTERS FOR VESSELS.—Orrin H. Ingram and Donald Kennedy, West Eau Claire, Wis.—This invention has for its object to enable a vessel, built sufficiently strong to run in the swift currents of rivers during high water, to run during low water or in shallow streams, and is especially designed for use upon the Western and Southern rivers which are deep and rapid during part of the year, and very low or shallow during another part.

LOOP FOR BEARING CHAINS.—James Bird, New York City.—The object of this invention is to improve the means or devices now commonly used for supporting the shafts of a cart or other vehicle from the shoulders or back of a horse or other animal.

SLEIGH BRAKE.—W. A. Niver, Scott, N. Y.—This invention has for its object to furnish an improved brake for sleighs, which shall be cheap, simple, durable and strong, which can be attached to any sleigh, which when attached will be entirely out of the way, and which may be used either to retard the sleigh in going down hill, or to hold it in going up hill, so that the horses may have an opportunity to rest.

DAMPERS.—Edwin Cox and A. W. Potter, Monroe, Wis.—This invention relates to an improvement in stovepipe dampers, and has for its object the more effectually regulating the amount of heat passing into the flue and securing a more perfect draft, and consists of a series of conical segments fitting together in the form of a furnace, and when closed resting on a shoulder in the stovepipe. Each segment is provided with shoulder pieces in which are inserted pins connecting the segments together. The whole is operated by a bent lever and catch.

HORSE RAKE.—Levi W. Frederick, Gosport, Ind.—This invention relates to improvements in the construction of revolving horse hay rakes, wherein great simplicity and economy are combined with great strength and durability, producing an implement which is managed easily and works perfectly on any kind of ground, whether the surface is smooth or rough.

MUSKETO NET.—Mary L. Treadwell, New York City.—This invention has for its object the constructing of a frame for musketo nets in such a manner that it may be readily applied to and detached from a bedstead, chair, lounge, or other article, and be also capable of being taken apart or unjointed so that it may be placed in an ordinary traveling trunk without monopolising much room therein, and carried without any inconvenience by families or individual travelers in making summer tours.

CULTIVATOR AND HILLING PLOW.—S. F. Seely, Sylvania, Ohio.—This invention relates to a new and improved cultivator and hilling plow, and the invention consists in a novel draft attachment so arranged that the line of draft may, by a simple adjustment of a slide, have such a direction relatively with the share and the wings, which are attached to it, that the device may be adopted for cultivating the soil, that is to say, taking out weeds, and pulverising the surface of the soil; or adapted for hilling plants, and also be capable of being adapted to suit the width of the spaces between the rows of plants, without any adjustment of the wings or any part pertaining directly to the share.

DOOR SPRING.—Henry S. Frost, Watertown, Conn.—This invention consists in the combination of a spring, bars, and friction pulley with each other and with the door-frame and door, and in the peculiar manner in which the rear ends of the bars and spring are connected to each other.

LUBRICATOR.—Samuel Lemon, Hoboken, N. J.—This invention consists in arranging a rod with a valve upon it in a lubricating globe or vessel in such a manner that the quantity of oil which is allowed to pass to the bearing or journal can be regulated with the greatest exactness.

SELF-ACTING RAILROAD SWITCH.—Jas. McLaughlin Duncannon, Pa.—This invention relates to an improvement on the construction and arrangement of railroad switches, which consists in connecting elastic rails on a main and side track in such a manner that the wheels of a locomotive and car shall move the rails by springing them apart parallel with each other and thus connect the ends of the rails on the main and side tracks.

MARKER FOR SEWING MACHINES.—Miss S. F. Brown, Savannah, Ga.—This invention relates to a new device for automatically marking the width of tucks before sewing them, and consists in the use of a tubular pencil holder which is pivoted to a sliding rod or bar, and which is provided with a spring by which the pencil is held in any one desired position in the tube. By the adjustable plate, the width of the tuck is regulated, while the oblique or other position of the pencil is regulated by a spring which holds the pivot pin that connects the rule with the sliding plate in any desired position.

ELEVATED BEDSTEAD.—D. Burnett, Bedford Station, N. Y.—The object of this invention is to so arrange bedsteads in apartments where room is to be economized, that the same may be completely concealed during day time, and whenever they are not used. The invention consists in suspending the bedstead by means of ropes or cords from the ceiling of the room in which they are arranged, the ropes passing over pulleys that are provided in the ceilings, so that by pulling the ropes the bedstead may be elevated to the ceiling and be fitted in a recess provided therein for its reception.

SPRING BED BOTTOM.—Samuel C. Jennings, Wautonia, Wis.—This invention has for its object to furnish a simple, cheap and efficient spring bed bottom.

MACHINE FOR CLEANING AND BLENDING FIBROUS MATERIAL.—Alphonse J. Loiseau, Philadelphia, Pa.—This invention relates to a new machine for dividing and separating from each other the fibers of woollen, cotton, flax, hemp or other fibrous material, for the purpose of cleaning damaged or soiled fibers without breaking or weakening the same and also for the purpose of blending and mixing the fibers of different colored materials, which can be done so completely, that, it will appear as if the fibers had been dyed with the color in which they appear, when discharged from the machine.

MACHINE FOR SHAVING AXES.—H. C. Reynolds, Manchester, N. H.—This invention relates to a machine, in which the blade of an ax, which is to be shaved is placed upon a reciprocating block, the lower surface of which is concave, and which rests upon a convex or stationary bed, the form of which is such that as the aforesaid block moves to and fro it will give such a motion to the ax, that the knife for shaving can be held almost stationary; the curve described by the ax under the knife being like that, which it is intended to impart to the surface of the ax.

SEWING MACHINE.—H. E. Froehlich, Easton, Pa.—This invention consists in the use of wire arms, which are laid over the spools for the purpose of holding the thread and preventing it from slipping; said arms being secured stationary to the machine.

BRICK MACHINE.—P. Hayden, Pittsburg, Pa.—This invention relates to a brick machine of that class in which the clay is pressed into a revolving mold wheel, is then carried in the same to the press, which consists of a vertical plunger and corresponding mold, between which the clay is pressed into the required shape, and is then carried by the wheel to an endless apron, whence the completely molded and pressed brick may be carried to the drying apparatus.

SLATE-PENCIL SHARPENER.—F. G. Bottner, Bridgeport, Conn.—This invention relates to a new device by which slate pencils can be easily and nicely sharpened and pointed; the device being small and substantial so that it cannot be easily destroyed by children.

SPRING BED BOTTOM.—Henry Doebele, Philo, Ohio.—This invention relates to a bed bottom, which is so constructed that it can be easily taken out of the bedstead to be cleaned and which can be taken apart for transportation whenever desired, and easily put together again. It can be adapted to single or double beds or lounges, as may be desired.

NUTMEG AND SPICE GRATER.—Louis von Froben, Washington, D. C.—The object of this invention is to enable the cook to use up the whole of the nutmeg without lacerating the fingers upon the grater

CLOTHES HORSE RACK.—J. J. Newman, assignor to Erwin Wilson & Co., Middletown, Ohio.—This invention consists in attaching a hinged arm to a clothes rack, which extends horizontally when in use, and when not in use may be dropped by the side of the rack, so as to be out of the way.

SWING.—Aaron B. Nott, Fair Haven, Mass.—This invention consists in an improved swing, formed by the combination of the double rockers, with the upright supports and with the frame, from which the platform of the swing is suspended; in the combinations of springs with the double rockers, in the hinge, by means of which the double rockers are pivoted to each other, and in the combination of the brake with the horizontal frame of the swing, and with the central connecting bar of the supports.

SICK BED ATTACHMENT.—Norman Teal, Kendallville, Ind.—This invention relates to an ordinary bedstead of an adjustable bed bottom, which may be easily regulated to govern the position of the patient, and afford the means of ready access to his body when desired through the bottom of the bed. It consists in attaching the device to an ordinary bedstead.

WASHING MACHINE.—John F. Riggs and William M. Albin, St. Joseph, Mo.—This invention relates to a new and improved clothes-washing machine of that class which are provided with a reciprocating plunger to compress the clothes in the suds box, and by its action turn the clothes therein while compressing them, so that they will all be acted upon alike and all thoroughly cleansed. The invention consists in the novel means employed for operating the plunger and in the arrangement of certain detail parts.

REAPING AND MOWING MACHINE.—William F. Brabrook, South Hardwick, Vt.—This invention consists in attaching two sickles to the main frame of a reaping and mowing machine, in such a manner that the machine may be made to cut much nearer to stumps, stones, and other obstructions than usual, and allowed to conform to the inequalities of the surface of the ground much more perfectly than hitherto.

FILTER.—Alexander Fox, Poughkeepsie, N. Y. Patented July 30.—This invention relates to an improvement in filters for cisterns and other purposes, and consists in a divided box fitting into the bottom of the cistern or other reservoir, the said box being provided with a lid or cover having a hole through which the liquid to be filtered passes into the first compartment of the divided box. This, and all the other compartments save one, are filled with divers purifiers, as charcoal, sand, gravel, or the like, through which the liquid passes in succession, until it reaches the delivery compartment, whence it is pumped or drawn for use. The filter can be cleansed by merely reversing the stream and allowing the liquid to flow out from the first compartment by an outlet or tap provided for the purpose.

DOUGH AND BUTTER KNEADER.—Prince W. Robinson, New Bedford, Mass. Patented July 30.—This invention relates to an improved dough and butter kneader, and consists of a tray running on rollers in a frame, and of a corrugated roller, adjustable in bearings on said frame, operated by a crank.

MOP WRINGER.—Charles E. Wareham, Sedalia, Mo. Patented July 30.—This invention relates to an improved mop wringer, and consists of rollers, one of which is journaled in uprights and the other in a frame journaled in the same uprights, the whole set on a flooring running on casters.

EXTENSION NOTICE.

Charlotte B. Thompson, administratrix of John H. Thompson, deceased, James M. Thompson, and Hosea Q. Thompson, of Holderness, N. H., having petitioned for the extension of a patent granted to the said Messrs. Thompson, the 15th day of November, 1853, for an improvement in machines for trimming soles of boots and shoes, for seven years from the expiration of said patent, which takes place on the 15th day of November, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 30th day of October next.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

J. S. H., of N. H.—A solution of rubber is the best elastic and water-proof cement for cloth. The lightest colored varnishes are solutions of gum dammar or bleached lac. They are, however, not elastic.

F. G., of Ct.—Besides the invention of mirror and reticulated glasses, for which we have to thank the Venetians, the art of making glass beads was also first discovered in the glass houses of Murano, and is practised there at the present day on a very extensive scale. The small glass beads are fragments cut from pieces of glass tubing, the sharp edges of which are rounded by fusion.

J. C., of Ark.—To remove the disagreeable taste from new kegs, churns or other wooden vessel first scald them with boiling water then dissolve some pearlash or soda in luke warm water, adding a little lime to it, and wash the inside of the vessel well with the solution. Afterward scald it well with plain hot water before using.

A. W. H., of Mass.—The best varnish or paint for cloth contains as much pure linseed oil as can be got into it. The dried or oxidized film of linseed oil is nearly as elastic and tough as india-rubber.

H. M. S., of O.—Sulphur and rubber for vulcanized rubber are mixed by mechanical means. The proportions may be varied within pretty wide limits; a mixture of 2 sulphur with 3 rubber will answer well for hard rubber. The coloring matter for the dental rubber is vermillion.

J. B. A., of O.—"Is it economical, etc., to use rubber pipe to convey water 1000 feet to a fountain; head of water 30 feet" We think not. The rubber pipe would need some such protection as wooden pipe; will deteriorate by use and give the water an unpleasant taste and odor.

W. B., of N. Y., has an iron 1-inch pipe 1900, feet long with 100 feet fall from spring to lower end of pipe. The water delivered is not enough. Can it be increased without enlarging the pipe? He has thought of putting a 3-inch pipe on 12 or 15 feet of lower end in place of the 1 inch. As the case is stated we see no remedy but an increase of the size of pipe for the whole distance. W. B. is probably aware that the angles in the pipe, and air resting in the upper parts of the bends, lessen the amount of flow.

J. S. S., of Md.—For razor paste use jeweller's rouge or tin putty, and oil.

M. D. K., of Ky.—Watch dials are made of copper and enamel. The copper is brought into shape and the ingredients of the enamel, well ground together, are spread upon it in the form of paste. After baking in a muffle furnace, the surface of the enamel is ground and polished. The enamel is substantially the same as that used in iron culinary vessels.

C. T. D., of O.—Arnold's writing fluid is a mixture of sulphate of indigo and ordinary ink. It flows freely from the pen and at last becomes very black. On account of the large quantity of acid it contains, it is very destructive to steel pens, and for this evil we know of no cure. Arnold's ink has very properly gone out of fashion.

A. R. C., of Ill., writes relative to the uses and benefits of the rotary engine. He says he is not visionary, but believes that if the force exerted on the short crank could be applied to the periphery of a wheel there would be a great saving, and thinks he has discovered the means of applying this power. We do not agree with A. R. C. that there would be a saving of fuel and increase of power by applying the power exerted on the crank to the periphery of a wheel. The power exerted is constant, and is accounted for only by the effects produced. Whatever mechanical combinations are made to increase the initial power reduces it in proportion to the increase of friction by the addition of parts. The same power exerted on a crank or wheel of 24 inches radius is equal to, and no more than the same power exerted on a crank or wheel of 48 inches radius The law is, whatever is gained in power is lost in space, or whatever is gained in ease of working is lost in time of working.

J. F., of Ill., inquires about the proper dimensions of a smoke-stack of a furnace for a steam boiler. The data and diagram sent are not sufficient for an opinion which might be practically valuable. Smoke stacks of from forty to sixty feet high should have an area of about one sixth that of the grate surface. If the chimney is higher its area should be larger in proportion.

G. V. D., of N. J., asks what gives the red color to the water used in his steam boiler, which is collected in tanks fed from streams; the tanks being dug in blue clay. The red color is probably derived from oxide of iron in the clay or the beds of the streams which feed your tank. A convenient test for iron is that of dropping a few grains of tannic acid in a tumbler full of its water. If iron is present the water will become dark or black according to the amount of iron held in solution.

J. P. S., of Conn.—The curative properties of grindstone grit are probably to be accounted for by the presence of particles of iron, which is known to be a necessary constituent of the human body. It certainly is not due to the sand of the stone nor any other of its constituents.

T. W., of Pa.—All of the colleges of this state allow students to take a partial course of studies, and most of them have a special department of instruction in Civil Engineering. Among the latter we suggest that you address Columbia College of this city, and Union College at Schenectady.

D. H., of Mass.—The subject of "Old Style" is discussed on page 41. You will find the facts there stated substantially as you give them in your letter.

S. H. W., of Va.—You will find interesting facts concerning the distance shots have been fired on page 66, current volume. It is said that a Stafford projectile in experiments at West Point attained a range of 5 miles, with an elevation of the gun of 23½°.

R. D. C., of N. Y.—The galvanizing of iron diminishes its tensile strength. The zinc penetrates the iron and to some extent destroys its fibrous character. The effect is most noticeable on fine wire.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

For Sale Cheap—Second-hand Barrel Stave Cutter and Jointer, full set of Shoe Peg Machinery, Portable Grist Mill, and new set of Spool Machinery. H. H. Frary & Co., Jonesville, Vt.

Pattern Letters and Figures to put on patterns for castings, etc., etc., are made by Knight Brothers, Seneca Falls, N. Y.

Wanted the address of manufacturers of bronzed malleable iron castings. T. G. Packer, Mexico, N. Y.

A young man with a good education wishes employment by a Civil Engineer. Has had experience in field work, and is a good draftsman. Can furnish the best of references. Address "D," Post-Office box 500, Northampton, Mass.

Iron manufacturers are referred to the advertisement of P. Bright, in the advertising column of this paper. His announcement indicates something of importance to iron manufacturers and capitalists.

DEVICE FOR PERFORATING CIGAR ENDS.

The engravings represent a device for perforating that end of the cigar which is placed in the mouth, for the purpose of insuring a draft through the cigar, and for obviating the necessity of cutting off the end, which is apt to cause the wrapper to unroll much to the annoyance of the smoker. Fig. 1 shows the contrivance in perspective, and Fig. 2 in section. The base, A, is a block of wood or metal, or of any other suitable substance, in which are pivoted needles or spikes, on each of its sides, whether four or less. Sliding in a central, vertical recess is a movable block, B, which, after being depressed, is lifted back to place by the spiral spring, C. This movable block has a recess conforming to the shape of the uncut end of a cigar, as seen in Fig. 2. By placing the cigar in a vertical position in the sliding block, B, and pressing down upon it, the needles, D, in Fig. 2, are forced in and pierce the cigar, when they are withdrawn by the release of pressure. The recess in the movable block or piston holds the cigar end in shape and prevents splitting or breaking. This device was patented July 2, 1867, by Oliver Guinand, who may be addressed relative thereto at Vicksburg, Miss.

Fig. 1

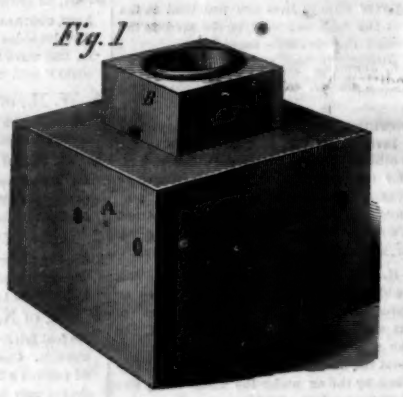
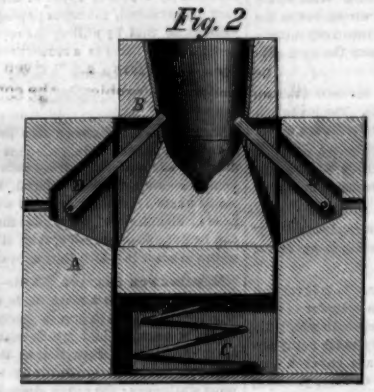


Fig. 2

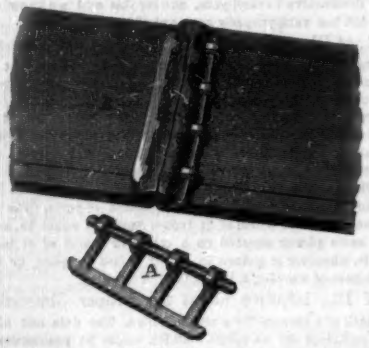


GUINAND'S PATENT CIGAR PIERCER.

IMPROVED CLASP FOR MACHINE BELTS.

Sewing, cementing, and riveting belts have each their disadvantages: the stitches of sewing and the heads of riveting wear away, and oil and moisture are inimical to cement. The engraving, however, shows a simple clasp that appears to be open to none of these objections. It is so secured to the belt that no portion of it comes in contact with the pulley face, and therefore cannot wear. The clasp is seen at A, and is of two parts—a frame and coupling rod or bar. It may be made of brass, iron, or any tenacious metal, and can be punched from sheets by machinery, the ends of the arms being turned to form eyes either circular, square, or oblong, for the reception of the locking or coupling rod.

The manner of its application will show one of its advantages—that of durability. The ends of the belt are properly squared, the holes made for the reception of the arms or tongues; the two ends of the belt are then placed with their inside surfaces together, and the tongues passed through, and the coupling rod inserted through the loops. The belt is



then straightened, when the edges of the belt will rise and form a ridge turned nearly at right angles to the belt, as seen at B, by which means the clasp is, in a measure, imbedded in the belt, or rather kept from the face of the pulley by the tongues being passed through the projections of the belt. The locking rod may have on one end a spur to engage with the outside of the belt and prevent it from working loose.

Patented Nov. 20, 1866, by Kromer & Ohlemacher, Sandusky, Ohio, who will reply to all communications upon the subject.

Manufacture of Our Small Coins.

The following from the Philadelphia *Ledger*, in connection with the article in our issue of August 17th, on Nickel, will be read with interest:—

"The one and two cent coins now made at our mint, are of bronze, and do not contain nickel, as many persons suppose. The three and five cent coins are of an alloy composed of one-fourth nickel and three-fourths copper, and these latter coins are government promises to pay. The nickel works at Camden, N. J., have supplied to the mint nearly all the nickel hitherto used for those coins: though owing to the inequitably low import duty on nickel (fifteen per cent.), it was found necessary to stop refining at Camden, and to send to England the partially worked ore of Gap Mine, to be refined there and brought back to the mint as finished nickel. Having recommenced a year ago to refine nickel at the Camden works with the aid of the best European skill, they have since then supplied the mint with a choice quality of nickel, American made throughout, at the current rates, considerably lower than the average price heretofore paid by the mint.

About a month ago, however, the officers of the Philadelphia Mint, by inviting proposals from England, entered into contract with an English firm for a supply of nickel a few cents under the American market price, so that considerable of our coin will hereafter be really made out of English metal.

The total value of the Gap Mine and Smelting Works, and Camden Nickel Works, is but about $300,000, though those establishments employ 200 hands and a capital of $300,000. That product is, however, capable of yielding German silver wares worth $10,000,000, or coins to the amount of $3,000,000.

Nickel is a white metal requiring a high temperature for fusion; it is magnetic, and has a specific gravity of 8.5. It is not an abundant metal, there being but three or four localities of it in the United States, and the only locality where it is profitably worked is in Lancaster county, Pennsylvania, about four miles southwest of the Gap station on the Pennsylvania Railroad. A remarkable fact in regard to this metal is that it forms an important ingredient in most aerolites and in the masses of native iron found in various parts of the world, and which are supposed to have had an aerial origin.

The furnace for reducing the nickel ore is about one-half mile north of the mines. The ore is brought here and roasted in large ovens to expel the sulphur with which it is charged. It is then smelted in a small furnace, somewhat similar to an iron furnace, with a flux of limestone and quartz, the fuel being coke. It is run into "pigs" which are generally porous and friable, and contains a number of impurities, iron, copper, cobalt, etc.

These mines were opened with a view of obtaining copper, but the ore was soon discovered to be richer in nickel, a more valuable mineral, and since then they have been worked for that metal exclusively. The introduction of nickel cents by the government, and the war, which rendered small change so scarce, gave great impetus to these works.

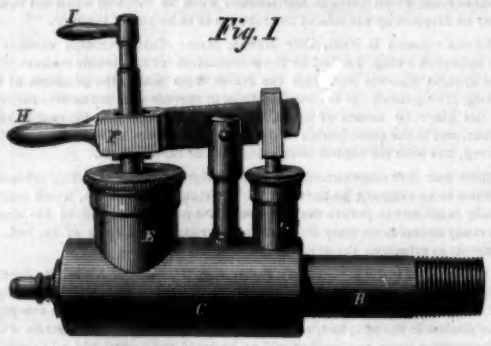
The coinage of pennies at the mint, during the month of July, was as follows:—

	No. of Pieces.	Value.
One-cent pieces	1,252,500	$12,525 00
Two-cent pieces	285,000	5,700 00
Three-cent pieces	382,000	11,460 00
Five-cent pieces	3,188,000	159,400 00
Total	5,107,500	$189,085 00

FULTON'S ALARM GAGE COCK.

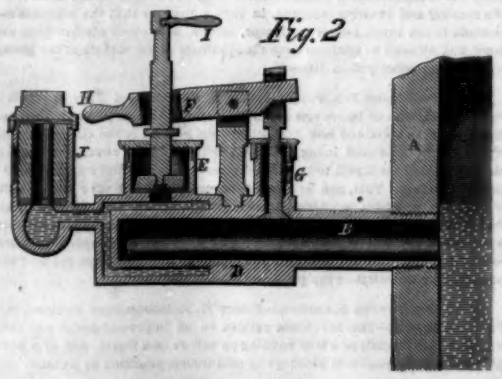
The instrument illustrated in the engravings is a combination of the common gage cock, the alarm gage and the safe-

Fig. 1



ty valve, to which may be added the alarm whistle. In this invention a blow-off valve is operated by a cup, ordinarily

Fig. 2



holding water, which forms a part of the device. Fig. 1 is a perspective view of the apparatus, and Fig. 2 a sectional view having a chamber added at the end for a purpose to be presently explained. A, Fig. 1, is the head of a boiler, and B the pipe of the gage, C. The cock is tapped into the boiler at the low water line. A cup, D, either surrounds the bore of the cock or is placed immediately over it and is filled with water. So long as the water of the boiler fills the pipe, B, and is at the ordinary temperature the water in the cup, D, remains unchanged, but if the water in the boiler gets low so that steam fills the pipe, or if the boiler foams, the water contained in the cup is caused to boil and generate steam. The steam thus generated acts upon a piston in the chamber E, which communicates with the cup, D, and raises it, and that in turn raises the lever, F, which at its other end depresses a downward opening valve in the chamber, G, which communicates with the pipe, B, and consequently with the boiler. The result is an escape or blowing off of steam from G, thus relieving the boiler and giving an alarm. If some more far-reaching alarm is desired a steam whistle can be attached to be operated by the steam from the boiler. The state of the steam and water in the boiler may be tested at any time, as with the ordinary gage cock, by simply raising either of the handles, H or I. If it is thought best to combine with this gage the ordinary glass gage it can be done by the addition of a chamber, J, Fig. 2, communicating with the cup, D, and furnished with glass windows. Instead of water any other liquid may be introduced into the cup, D, so that the point at which steam will be generated in it may be accurately determined. This combination gage was patented through the Scientific American Patent Agency, April 23, 1867, by Lorenzo Fulton. For information pertaining to this invention, address John S. Beach, Terre Haute, Ind.

Success the Measure of Ability.

Prof. Silliman, of Yale College, says:—"Success is accepted as at once the test and the measure of ability, whether we speak of the triumphs of the forum, the cabinet, the sacred desk, the pursuits of commerce and industry, or whatever department of intellectual labor is taken as the standard of comparison. We cannot object to the judgment which is rendered upon this issue, provided the success is a genuine fruit of labor and talent, combined with the training of experience, and is not the offspring of a lucky accident. Mankind never fail to appreciate him who has at once the power and the disposition to serve them, in whatever sphere of usefulness or honor he may elect. Just in proportion to his power and willingness to serve will he be used. It matters not whether he makes bad poetry or bad bargains, society has no use for such, and the unfortunate author of either is left in merited obscurity."

COMBINED CRAYON SHARPENER AND WEIGHT FOR TAILORS.

The cakes of so-called "French chalk" used by tailors in outlining patterns on cloths are usually sharpened by the penknife, which is not handy, soils the fingers and wastes the chalk. The little implement herewith shown serves the double purposes of a sharpener and also a weight to keep the cloth in place while it is receiving the pattern. The body is of cast iron, having at the top a cup-shaped receptacle for the shavings of the crayon as it is edged by the knives set in the projecting supports. As will be seen, the cutters or scrapers have V-shaped slots, edged, and of the right form for sharpening the crayons.

It was patented in July 9, 1867. Orders for New York, Pennsylvania and Ohio should be addressed to John H. Woodward, 6 Howard street, New York city, and for the territorial rights for the Eastern States to Minor & Colburn, 7 and 9 Spring Lane, Boston, Mass.

Learn a Trade.

The Mobile *Advertiser* says that at no time in the history of the South was the absence of the mechanic arts more severly felt than within the last seven years. People are beginning, however, to have their eyes opened to the dignity and importance of labor, and the great value of the mechanic to the body politic.

The Richmond *Examiner* also offers sound advice on this subject, and says:—

The skilled man, with tools at his command, is in most respects, master of the situation. But the clerk, the bookkeeper, the office attendant are helpless. They must wait many and many a weary day, until the season or the years of depression are over, before they can find that employment for their pens which they have unfortunately made their sole means of livelihood. All this is another of the lamentable results of having learned no trade in boyhood. The subject is, indeed, one so wide in its ramifications, and so profoundly important in its consequences that it is time that it had engaged more thorough and systematic attention on the part of the people who are so deeply interested.

We refer our readers to an advertisement in another column, relating to Mr. Volkmann's patent self-guiding plow of which we gave a description in our issue of Dec. 23, 1866.

Nearly all photographic varnishes reduce the intensity of the negative. Mr. F. A. Wenderoth, of Philadelphia states that if a thin solution of gum arabic is applied to the negative after fixing and before drying, the varnish will not affect the intensity. This is a very simple and useful remedy. Mr. Wenderoth also states that he has long practised the covering of photographic paper prints upon both sides with collodion varnish, and finds it a complete preservative of the picture. Nearly all photographs will fade away in a few years unless thus protected. This method has been claimed by Mr. Blanchard, of England, but we believe that Mr. Wenderoth is entitled to the priority.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

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VOL. XVII., No. 8....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, AUGUST 24, 1867.

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THE IMPORTANCE OF LEARNING A TRADE.

We do not intend, under this heading, to speak of the importance of becoming an apprentice to any mechanical business, but of the importance of learning—acquiring—a trade, of becoming a workman at the business chosen. It is not enough that a young man goes into a shop and works for a longer or shorter period as a neophyte, but that he becomes master of the rudiments of his business. The country is filled with unfinished mechanics, every trade is overburdened with the miserable hangers-on who, professing a knowledge of a business, bring it into disrepute by their incompetency. There is no bond in this country by which a master can control the time of an apprentice for a period sufficient to remunerate the employer for the losses sustained in the early stages of the apprenticeship, or to give the apprentice a proper knowledge of his business. The apprentice is free to leave his master and employment, whenever, in his opinion, he has collected scraps enough of superficial knowledge to set up as an independent worker. He becomes dissatisfied with the character of his work or the amount of compensation, and, finding other work and larger pay, he quits his master's employment just when his services have begun to be valuable, thus committing a fraud upon his employer and doing a great injury to himself.

In no case is the term required to learn a trade too long. According to the value and difficulties of the business, it varies from three to seven years, and the most faithful and observant apprentice, after having filled his full term of apprenticeship, finds he has much to learn before he can honestly claim to be entirely and thoroughly competent. For at least a few months the apprentice is a constant source of anxiety and expense. From want of experience, or from heedlessness, or dislike to the particular job given him, he breaks tools and ruins work enough in a week to cover all the profits of his work for months. The employer bears with this, patiently or impatiently as the case may be, in the hope that during the last part of the novitiate's apprenticeship he may reap some return from the profits of his work. Under such circumstances it must be very vexatious to have an apprentice leave just when he is becoming, in some measure, useful. Yet it is a common occurrence in this country. Apprentices seem too often to be devoid of conscience and wanting in the principles of common honesty.

Nor is such conduct of any real, permanent advantage to the apprentice. He becomes the Bohemian of the workshop, a waif driven hither and thither, having a smattering of knowledge and yet understanding no one thing thoroughly. His services are not sought; he is only a "Jack-at-a-pinch," to be used merely to fill a space otherwise empty. Scores of such half-baked mechanics can be picked up any day; they infest shops, torment employers, and disgrace the business they falsely profess to understand. They are industrial vagrants, if such a term is permissible, to be shunned and despised by every honorable workman. "Unstable as water, they cannot excel."

The ambition of the apprentice to be ranked among journeymen is a laudable one when properly directed, but it can only be realized by an honest and persistent sticking to his obvious and plain duties. If he ever expects to teach he must first be taught; if he desires to direct he should submit to direction. What this country needs in the industrial arts is finished workmen. They are scarce and always in demand. A competent and intelligent workman is seldom wanting a good job. When business is slack the incompetents are first discharged, while the valuable workman is kept, often at a serious pecuniary loss to his employer, simply because it is difficult to fill his place.

These considerations have nothing new in them, but because they are so trite and hackneyed they are not enough considered by apprentices. We earnestly invite their attention to the subject, believing it will be to their present and prospective advantage to deal honestly in this as well as other respects.

MEASURING MECHANICAL POWER—THE UNRELIABILITY OF BELTS.

Probably no one thing is provocative of more dispute between landlords who let power and tenants who use it, than the amount thus let and used. The landlord, assuming to know the actual power of his engine and the amount used by one tenant, concludes that another employs a larger proportion than he pays for. The tenant points to the width of his belt and bases the amount of power furnished him on that.

Now, scarcely anything can be more deceptive and unreliable. A belt running horizontally and another vertically, although of the same length and width, are two entirely different mediums for the transmission of power. The distance between the driving and driven pulleys is another disturbing element in the problem; the condition of the belt itself, the surface of the pulleys, whether the belt is a "quarter turn," a cross belt, or an open belt, are all difficulties in the way of a correct estimate of the amount of power transmitted by them. Neither do we know of any dynamometer to be applied to the shaft which is entirely reliable.

But the proper means of estimating power must be looked for in the prime mover; and in the measuring of the amount of power from it diverted to any portion of the work performed by the engine, may be seen one of the advantages of the steam engine indicator. This implement has not, as yet, attained the notoriety to which it is entitled. There may be doubts whether it can determine the absolute power of one engine when not compared with another, as some mechanics claim; but there is no reason for supposing it is not valuable as determining the relative powers of different engines and the power of the same engine under different circumstances. This being the case, it is a comparatively easy matter to ascertain what amount of the whole power of the engine is diverted to one point or another. All the work, except the driving portions—the necessary shafting—being thrown off, let "friction diagrams" be taken. These give the amount of power exerted to drive the intermediates. Then let Mr. Smith put on his average amount of work and have another set of diagrams taken. This properly noted, let Smith throw off his work and Jones put on his, and proceed as before. A comparison of the different diagrams will infallibly point out the exact, and the relative amount of power used by each tenant.

Every engine should be indicated. What is the use of talking about the "nominal" horse-power of an engine? One man building an engine with cylinders 7 by 10 inches and another one 8 by 10 inches, and another 8 by 8 inches, all claim for their respective engines the same horse-power. One may be right, but if so, the others must be wrong. Only the indicator can give the test. It is fortunate that it has come into use. It will decide and has decided disputes which might puzzle a "Philadelphia lawyer." It is the great friend of the engine builder, the engine runner, the hirer of power, and the furnisher of power; a benefit to the buyer and seller of engines, the manufacturer, and user. Its use is daily becoming more and more known and its benefits more and more appreciated.

THE EAST RIVER BRIDGE.

Operations upon the projected bridge which is to connect this city and Brooklyn, have actually begun. For several days past workmen have been engaged on the Brooklyn side of the river, in making borings to determine the character of the substratum where it is purposed to build the piers. The plans which have nearly been perfected, contemplate the erection of a structure of such proportions that a brief statement in regard to some of its important features, must be of more than merely local interest.

The narrowest part of the East river is between Fulton ferry slip, Brooklyn, and near Pier 29 on this side, and here will be located the towers. The initial point of the bridge in Brooklyn city will be, without doubt, at or near the intersecting of Sands and Fulton streets. For the other terminus three localities have been proposed, but the New York City Hall park will, in all probability, be the one selected, the total length of the bridge then being 5,862 feet. The bridge proper will be eighty feet wide, increasing for five hundred feet on either end, to a width of one hundred feet. There will be four roadways, two each for going and returning passengers, and two for cars or carriages. Above these roadways is to be an elevated promenade, sixteen feet in width: the center of the bridge will be 130 feet above high water mark. The towers for suspending the cables, each 150 feet high, are to be located inside of the pier lines established by the law, and at a distance apart from center to center of 1,600 feet. The grade of the bridge approaches will be 3½ feet in 100, and the company propose to utilize all the ground over which it thus passes, by making stores and warehouses beneath. Flights of stairs leading to the corners of cross streets, will do away with the necessity of obliging passengers to travel to the main entrances.

The lowest estimate of the cost of this bridge is $6,000,000, and the company who are to build it must have a capital of not less than $8,000,000. Many details of construction can not now be given, but will appear as the work progresses. The first year's work will be simply laying the foundations, and four or five more must pass before the undertaking will be completed.

The proposed bridge promises to be a magnificent structure; but the stockholders will pay dearly for the whistle. For the six millions which this one bridge is to cost, seven or eight tunnels might be laid down across the bed of the river, one for each of the principal streets of Brooklyn. Through these tunnels steam cars might run and carriages pass, affording quicker, safer, and better facilities for communication than a single suspension bridge.

THE CAREER OF A WORKING MAN.

We do not intend to select an exceptional case in noting a few facts in the life of the mechanic whose course is the subject of this paragraph: this case is chosen because it is *not* exceptional; there are hundreds of a similar character, and the encouragement to young and struggling mechanics is all the more valuable.

A short time ago the workmen employed by Mr. John Snowdon, the proprietor of the Snowdon Iron Works, of Brownsville, Fayette county, Pa., made him a presentation as an evidence of their respect and esteem for him as a man and employer. Fifty years ago Mr. Snowdon came from Yorkshire, Eng., and settled in Brownsville. He went to work as a blacksmith for one dollar per day. After a time he started business for himself, his bed the floor, his table a box, and his seat a block. He gained slowly, until he succeeded in erecting and putting in operation a foundery, machine, and pattern shop, employing two hundred hands. He has built the machinery for about three hundred steamboats, some to run on the Monongahela, on which Brownsville is situated, some for the Ohio, Missouri, Mississippi, the lakes, and gunboats for the Government to run on the Rio Grande and the sea. Iron bridges and all descriptions of engineering machinery have also formed a part of his manufactures. For more than forty years he has aided in building up his section of the country, and during a good part of the time furnished employment to a large number of workmen.

Many men have done greater things, met with more notable success and been better known in the world, but Mr. Snowdon's course is none the less instructive because unobtrusive. It is simply that which is open to hundreds of others who unite with common capabilities for business, industry, perseverance, and will.

COMPARATIVE WEIGHT OF ENGLISH AND AMERICAN SCREW ENGINES.

In the Paris Exposition there are the engines for the English sloop of war *Sappho*, built by Penn from designs of the Chief Constructor of the English navy. The *Engineer* gives their dimensions and weight, by which it appears that although calculated to work up to 2,000 indicated horse power the total weight of the engines is but 74 tuns. These engines are not exceptional; there are many similar ones in the English navy.

On the other hand, the engines of the *Lackawana* and other screw sloops of our navy are reported by the board of examiners—composed of such men as Copeland, Bromley, Wright, Hibbard, Everett, Coryell, Merrick, Bartol, etc.—as being of only 1,000 horse-power, yet they say if proper proportions had been observed 60 tuns of weight might have been saved! Query: is there no room for improvement in our naval machinery?

TRIAL OF STEEL RAILS—NOVEL RAILROAD OFFICE.

The New York and New Haven Railroad Company are testing the steel rail in a section between Port Chester and Greenwich. The President of the road, Hon. W. D. Bishop, formerly Commissioner of Patents, is an energetic, practical man, and we shall look to him for a report on the subject which will be conclusive of its practicability. Mr. Bishop is the first railroad president to adopt the plan of locating his office on wheels. His office is a neatly fitted car, and his head quarters may be truly said to be any where between New Haven and New York that his presence is required.

AGRICULTURAL ENGINEERING.

Once in four years the Royal Agricultural Society offers prizes for the best portable and fixed steam engines (of dimensions prescribed within certain limits) entered for trial at the Worcester show in 1863, and that for this year has just been concluded at Bury St. Edmund's. The various portable engine factories in the kingdom, perhaps forty or fifty in number, are now able, if fully employed, to complete upwards of fifteen hundred engines yearly; a fact sufficient to show both the extent of the trade and the competition which attends it. The Royal Agricultural Society's prizes are, therefore, keenly contested for, and, although the engines entered for trial are generally of a more expensive, and, possibly, less durable class than those ordinarily sold by the same makers—being in fact, what are known as "racers," only seldom bought for actual work on the farm—it is indisputable that these competitive trials have done, and are doing, much to raise agricultural engineering to the highest standards of efficiency and economy. There are many of our readers who can even now recall the time when, under the practice of the Liverpool and Manchester engineers—in the days of John Gray and John Dewrance, who were always encouraged by that paragon of railway secretaries, Mr. Henry Booth—locomotive engineering was refined and perfected almost beyond all previous expectation, the consumption of coke being diminished from 40 lb. or 50 lb. to 18 lb. per train-mile. There are many who can recall the time when the Cornish engineers, by emulation and the greater care which it inspired, were raising the duty of

their engines from 30 or 40 up to 70 or 80 millions, and sometimes to even more. And we have more lately seen how, by increased attention to the conditions of marine-engine economy, a consumption of from 5 lb. to 7 lb. of coal per indicated horse power per hour has been brought down to from 2½ to 3½ lb.

Something like these reforms has been introduced into portable-engine practice by the agency of the Royal Agricultural Society's quadrennial trials, and we have this year an engine running steadily for nearly three hours with a consumption of but 2½ lb. of Welsh coal per effective or dynametrical horse power per hour, equal probably to about 2½ lb. or 2¾ lb. of coal per indicated horse power per hour, the measurement to which most engineers are better accustomed. Put into Cornish notation, 2½ lb. of coal per effective horse per hour means a duty of nearly 88½ millions of foot-pounds for each hundredweight of coal, a result which, we need not say, has been but rarely surpassed even in Cornwall.

This result is, of course, a maximum result, obtained by the exercise of the greatest care in design, in construction, and in working. That in the working was perhaps the most remarkable of all, and we say, advisedly that it would have well paid any farmer employing steam power to any considerable extent, as many now do, to have sent his engine driver or drivers to Bury, even from a distance of 200 miles or more, and to have kept him or them in the show yard during the whole period of the trials, to study the wonderful jockying (and we do not employ the term reproachfully) of George Wilkinson with Clayton, Shuttleworth and Co.,s engine, of Robert Gelles with Tuxford's engine, of John Bristow with Ransomes and Sim's, and of Whitcombe with the Reading Ironworks', engine, the latter when worked to 50 per cent. above its nominal power, giving the greatest economy of fuel yet recorded, Clayton and Shuttleworth beating on the trials at nominal power. Not perhaps that the care was so much, if at all, greater than that of railway engine drivers, when working, as they lately did on the Great Eastern Railway, by contract; but railway practice is not often accessible to portable engine drivers, nor, differing so much as it does from their own, does it so directly carry home its lessons of example. Even if they be not likely to be generally repeated in every day practice, it should be as interesting to the large farmer—the steam farmer we will call him—as to the engineer to observe the expedients by which a little engine, not working within a warm house, but in the open air, is nevertheless enabled to rival, in its dynamical results for a given weight of coal, the triumphs of Cornish and marine and locomotive practice. Not only is the boiler lagged, but it is sheltered from winds and rain, and there was rain and wind in plenty, and more than enough, last week and this, at Bury. The coal is broken into lumps hardly larger than dice; it is fed to a fire hardly three inches thick (plenty were told, and some, perhaps, believed, that some of the fires were not one inch thick). The distribution of coal upon the grate is as even as the utmost care can make it; the firedoor is never allowed to be open a moment longer than absolutely necessary; the ash pan is carefully cleared of cinders and bits of unburnt coal, to be added to the fire for the final effort when all the clear coal is gone; the ash-pan damper is regulated with the nicest care, and where not tight in all its joints, all openings except at the bottom are carefully stopped with rags, so as to compel the entering air to pass through the whole volume of heated air contained in the pan; the feed-water is heated by waste steam almost to boiling; the safety valves are screwed to slightly more than the working pressure, and the latter is maintained to half a pound at one fixed point on the gage; the slide and expansion valves are, in the best engines, set exactly to the intended work, and the regulater is kept wide open where this is possible, as in many cases it was; the brasses of the engine are left to run as freely as can be tolerated in respect of thumping; the piston packing is in the most perfect condition, neither tight nor loose, as drivers understand the terms; the oiling is assiduous and just sufficient, and everything is done that the driver, with all his wits about him, can think of to prolong the time of work with the quantity of coal so scrupulously weighed out to him. It is here that engine driving, or even boiler-stoking, becomes a profession; and there was a curriculum of technical education, in at least one of its important branches, in the week's trials concluded on Tuesday last. Could the large competing firms make drivers as well as engines, they would surely increase their trade in the latter, and it might even pay, in the way of business, or to educate the former gratuitously, for nothing would more hasten the adoption of steam upon the farm, both at home and abroad, than a general understanding and practice of the best principles of engine-driving, so splendidly exemplified in the trials at Bury.

It is difficult to point to any new feature of design which has attributed to the excellent results attained. It is even difficult to say what the results prove as to many questions of plan and proportions which are often discussed by engineers, and, now and then, by steam farmers. Clayton's double cylinder engine beat his own single-cylinder engine; but this could not have been because of this difference in the number of cylinders, since the double-cylinder engines were worked at 80 lb., while the single cylinders were limited to 50 lb.

This enabled the double-cylinder engines to work more expansively, and possibly it will be said with more expansion than a single engine would bear, and still work with uniformity. With 80 lb. steam, however, the single engines would have run well, cutting off at one sixth stroke, and but one only of the double-cylinder engines tried cut off as short as one-eighth, and only one other as short as one-sixth. The reason for the difference of pressure is, no doubt, that double cylinder engines are now oftener made for plowing, and are better made for this purpose than common portable engines, mostly with single cylinders, which would (not, however, because the cylinder is single) not be safe at 80 lb. As a matter of fact, the best result attained in the trials, the best perhaps on record, was had from a single cylinder engine working to one half more than its nominal power—the system of testing the engines not only to their nominal power, but, subsequently, to one half as much more, having been introduced for the first time at the trials at Bury. So, too, some of the engines, which were not doing particularly well, were observed to have strokes more than 12 inches long, and were hence called long-stroked engines. We heard some good judges assert that the long-stroke engines would be nowhere, yet the best result of all, and that when working to one half more than the nominal power, was obtained with the longest stroke of all, viz, 18 inches.

Without looking forward, at present, to better results than the best that have been booked at Bury, we must hope to see such results become more general, and that consistently with reasonably economical construction and working. At present ordinary portable engines burn, as they burnt at Bury, from 5 lb. to 9 lb. of coal per horse power per hour, or, on the average, twice what they ought. In other words working a 10 horse engine up to 15 horse, for ten hours a day, they burn 7 cwt. to 12½ cwt. per day, so that with coal at 1s. a cwt., the difference in the cost of fuel between the most economical and the most wasteful engine would amount to 9s. per day, and the average difference might be taken at 5s., equal, for even 100 days' working in the year, to the interest on £500, or to that on £350 even if 1s. 6d. extra were paid for a first rate driver. The means of economy lie in sound construction, thorough lagging of the boiler, heating the feed water, liberal expansion, in short, the most miserly care to prevent loss of heat, heat being the true representative of power. All this and the most careful firing and fettling of the engine are necessary to economy. And will other engine makers allow one or two, or even three or four, firms to run off with the great prizes of these Exhibitions? It takes a great deal of money to carry on business in these days of competition, but it is sound policy to expend the money judiciously in building better engines, and with this to keep in sight every means, even to the most refined to secure economy of working. And what wonderful results would be attained, too, by prizes for engine driving as well as prizes for engines. If bets were made on engine races, the winning jockeys would come in for handsome gratuites, as happens with the triumphs at Epsom, at Ascot, and at Newmarket; and, seriously, good engine-driving is just now most wanted of all on the steam farms of England

We are almost amused at reading the above from the *Engineering*. It seems strange, indeed, that such care must be used in the firing of the boilers and the distribution of the coal on the grate; that the "ash-pan should be carefully cleaned of cinders and unburnt coal;" that "all openings except at the bottom—the draft—should be carefully stopped with rags;" that the "feed water should be heated by waste steam almost to boiling; the safety valves screwed to slightly more than the working pressure! and the brasses of the engine left as free as can be tolerated in respect to thumping," etc., etc.

Surely the experiment should have succeeded under such circumstances, if there was any merit, whatever, in the engines. This extreme carefulness to details is impossible in ordinary work, then why should it be observed in competitive trials? The proper test for agricultural as well as for other machinery is simply to try it under the ordinary and extraordinary circumstances of daily use. The suggestion of prizes for engine driving is a good one, and we do not see why that and firing should not be made objects of competition.

The results of the trial referred to in *Engineering* were highly satisfactory, the consumption of coal per dynametrical horse power per hour being 2·54, 2·71. 2·98, and so on up to 7·99. We doubt if equal results have ever been attained in this country. There is no doubt, however, that everything was arranged even to the minutest details to this end. Such results give as much future promise as present gratification.

OFFICIAL REPORT OF
PATENTS AND CLAIMS

Issued by the United States Patent Office,
FOR THE WEEK ENDING AUGUST 6, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

67,395.—MACHINE FOR TWISTING Augers.—W. L. Aldrich, Norwich, Ct., and William Evans, Seymour, Ct.

1st, We claim regulating the twist of augers and bits by means of the rollers, g g, or their equivalents, arranged upon a slide rest, and operating substantially as described.

2d, The combination of end supports, a' b, with the regulating clamps, g g, substantially as described.

3d, The construction of the female back center, b, substantially as described.

67,396.—SCREW PLATE.—Walter Ashton (assignor to himself and Edward K. Quinn), Utica, N. Y.

I claim, in a screw plate, the chaser, C, gibs, D and E, and set screws, D1 and E1, or their equivalents in combination, constructed and operating substantially as described and for the uses and purposes mentioned.

67,397.—BEDSTEAD.—Wm. K. Bacall, Boston, Mass.

I claim the folding bedstead, or combination of the head frame, the door part, B, and the auxiliary frame, E, arranged and connected together, and with the case, A, substantially as specified.

I also claim the combination of the legged supporters, C and F, or their equivalent, with the door part, B, and the auxiliary frame, E, arranged and connected together and with the case, A, as specified.

I also claim the combination of the head frame, D, the door part, B, the auxiliary frame, E, and the supporters, C F, arranged and connected together and with the case, A, substantially as described.

67,398.—BENCH PLANE.—Leonard Bailey, Boston, Mass.

I claim the arrangement of the two parts, A B, of the stock together and with slots, c d, and clamp screws, a b, as described, whereby such parts may be adjusted with reference to each and clamped together, as and for the purpose specified.

I also claim the combination as well as the arrangement of the adjusting screw, F, and nut, E, or the equivalent thereof, and the bent lever with the plane stock. Also the arrangement of the hole, K, in the cap iron, to operate with the adjusting lever, combined with the screw and nut, or the equivalent thereof, and applied to the stock, as set forth.

67,399.—TWEER.—W. W. Ball, Charlestown, Ill.

1st, I claim the combination of the blast tube, A, valve, d, and air chamber, all constructed and arranged as described.

2d. The disk, E, having the steps, e' e' e', operating in connection with the projections, f f f, on the inner surface of the plate, C, and having the series of holes around its margin, and the square central aperture, c, substantially as and for the purpose specified.

67,400.—INKING APPARATUS FOR PRINTING IN COLORS.— Thomas L. Bayliss and George W. Wood, Richmond, Ind.

1st, We claim two or more separate continuous inking fountains, B B1 B2, in combination with two or more intermediate adjustable sectional rollers, I I1 I2, and other distributing rollers, by which the ink of different colors is transferred from the fountains to, and properly arranged in bands upon, a common roller, substantially as set forth.

2d. The combination of two or more adjustable sectional inking cylinders with the soft intermediate roller, K, and the hard roller, L, substantially as set forth.

3d, The arrangement of two or more sets of adjustable sectional inking cylinders in relation to each other and to the roller to which they transfer their colors, substantially as set forth.

4th, The combination of the distributing rollers, the transferring rollers, and adjustable inking cylinders with the roller, K, substantially as set forth.

5th, In combination with an elastic roller, we claim so arranging the boxes of the latter that they may be locked so as to regulate the play thereof, substantially as set forth.

6th, The arrangement of the frame, G, rack, O1, pinion, N, pulleys, N1 h h1 and h2, and the connecting belts, substantially as and for the purpose set forth.

67,401.—PADLOCK, ETC.—Wilson Bohannan, Brooklyn, N. Y.

1st. I claim, in combination with an oscillating plate, C, to which the notched slides, e, are suitably applied, the parallel moving plate or knife, f, attached to said plate or guide, substantially as described.

2d, The combination of the plate or knife, f, slides, e, and oscillating plate, C, with a vibrating lever arm, which is guided and controlled by a fixed stud, j, or its equivalent, substantially as described.

67,402.—PLATE LIFTER.—C. F. Bosworth, Milford, Ct.

I claim the combination of the two jaws, A and B, with their respective levers, D, arranged upon a handle, C, so as to operate in the manner herein described.

67,403.—MACHINE FOR MAKING NUTS.—John R. Bridges (assignor to himself and G. O. Fancett), Pittsburgh, Pa.

I claim, 1st, The annular semi-cylindrical or semi-oval recess on the face of the squre die, E, for forming a raised bead around the eye of the nut, all as described and represented in fig. 5 of the drawings.

2d, The bar, G, provided with pins, a a and c c, in combination with the die, E, and standard, I, for the purpose herein before described.

3d, The cutter, D D, when so arranged in a double operating nut machine as to pass the nut bar, from which the nut blank has been severed, to the proper position for feeding into the other end of the machine, substantially as hereinbefore described.

4th, The combination of the blocks, J J1, bottom plate, H, cutter, D, and bar, G, for forming a matrix or nut box to enclose the nut while it is being pressed and punched, and which shall open to release the nut on the withdrawal of the pressing die.

67,404.—ROLLING MILL.—Pittman Bright, Philadelphia, Pa.

I claim, 1st, The shaft, D, its collar, l, enlargement, f, and adjustable collar, c, in combination with the shaft, F, its collar, l, enlargement, f1, and adjustable collar, G1, the whole being constructed and arranged substantially as and for the purpose herein set forth.

2d, The collar, G or G1, composed of the ring, m, with its corrugated or notched end and the ring, n, with its rim, q.

67,405.—UMBRELLA.—John Brown (assignor to William V. Brown), New York City.

I claim a woven umbrella or parasol cover having pockets for the ribs woven into or with the web of which it is formed, essentially as herein set forth.

67,406.—FOLDING TABLE.—Julia P. Brown, Boston, Mass.

I claim the combination and arrangement of the cammed shoes and the spring catches, the table top, and the two sets of legs, arranged and applied together and to the table top, substantially as specified, such shoes being made with holes or recesses in their sides to receive the hooks of the catches, as set forth.

67,407.—MARKER FOR SEWING MACHINES.—Sarah F. Brown (assignor to Chas. W. Brunner), Savannah, Ga.

I claim, 1st, The adjustable bar, A, in combination with the pin, C, and tube, D, all made and operating substantially as and for the purpose herein shown and described.

2d, The toothed pin, C, and spring, E, when arranged as described, for the purpose of holding the tubular pencil holder, D, on the adjustable plate, A, in any desired angle of inclination, as set forth.

3d, The spring, F, when arranged on the side of the perforated tube, D, and when provided with a pointed or sharpened end, as set forth, for the purpose of holding the pencil in the tube and for fitting the same tube to larger and smaller pencils, as set forth.

4th, The plate, A, pin, C, and spring, E, in combination with the tube, D, and spring, F, all made and operating substantially as and for the purpose herein shown and described.

67,408.—SOAP HOLDER.—Richard Bush, South Brooklyn,

I claim, 1st, The soap holder with the revolving bottom, substantially in the manner and for the purpose set forth.

2d, The whole device, as an article of manufacture, when constructed substantially in the manner and for the purposes set forth and described.

67,409.—SEED PLANTER.—L. A. Butts, Ripon, Wis.

I claim the hoppers, J and L, seed distributers, a and i, seed cups, e and o, shaft, W, driving wheel, V, pulley, p p, conductor, q, lever, U, guide pins, r, guides, t, and rope, K, in combination with the vertically adjustable frame which carries the seeding devices, all arranged and operating as set forth.

67,410.—TELEGRAPHIC INSTRUMENT.—S. G. Cabell, Quincy, Ill.

I claim, 1st, Operating a telegraph instrument by means of a magnet consisting of a helix interposed between two concentric pieces of soft iron, the inner forming a central core and the outer one a covering for the helix, substantially as described.

2d, The combination of the electro magnets, A and B, with the connecting piece, h, arranged so that by moving it to and fro, the magnets may be connected or disconnected at will, substantially as described.

3d, The combination of the magnet, A, with its vibrating arm, I, and the magnet, B, with its vibrating arm, G, when arranged to form one instrument, and to operate as and for the purposes herein set forth.

67,411.—RAZOR.—Gouveneur Carr, New York City.

1st, The combination of a razor blade with the guiding gage, substantially as and for the purpose specified.

2d, The combination of the razor blade and guiding gage by means of a hinge joint and holding mechanism, substantially as and for the purpose set forth.

3d, The combination of the two guiding gages, or two-part case, with the razor blade by means of a three-part hinge, or the equivalent thereof, substantially as and for the purpose set forth.

4th, The combination of the razor blade, the stock to which it is hinged, the guiding gage, the connecting hinge, and the holding mechanism, substantially as and for the purpose specified.

67,412.—SASH PULLEY.—Henry Cash, Newport, Ky.

I claim, as a new article of manufacture, the combination of the flat piece, C, pivot, G, and sheave, F, the said plate being provided with bosses, H, and all constructed and adapted to operate as and for the purposes described.

67,413.—STEAM INJECTORS.—Nathan L. Chappell (assignor to the Chappell Patent Steam Valve, Pump, and Bilge Ejector Manufacturing and Furnishing Company), New York City.

I claim the inlet chamber, B, constructed with a contracted throat, a, and arranged with reference to the steam inlet pipe, D, and chamber, C, substantially as herein set forth for the purpose specified.

67,414.—LAST.—Aaron W. Cheever, Lynn, Mass.

I claim the block last, A B, constructed substantially as above described and for the purpose set forth.

I also claim making the draft line straight on the exterior surface of the last from a point near the heel to a point near the ball of the foot, substantially as and for the purpose set forth.

I also claim forming a projection, g, on the toe end of the block of the last, substantially as and for the purpose described.

I also claim increasing the width and reducing the length of the groove in the last proper, as and for the purposes specified.

67,415.—STOVEPIPE DAMPER.—Edwin Cox and A. W. Potter, Monroe, Wis.

1st, The shoulder pieces and pins for connecting the segments of a damper, substantially as shown and described.

2d, The collar or shoulder, K, for supporting the damper in combination with a damper in divider.

3d, The thumb latch attached to the end of the lever for opening and closing the damper without bringing the hand of the operator in contact with with heated metal, substantially as shown and described.

4th, The mode of securing the thumb latch and lever by means of pins, substantially as described.

5th, Combination of parts forming our improved damper, substantially as shown and described.

67,416.—LID FOR KETTLES, PAILS, ETC.—S. B. Cox, Buffalo, N. Y.

I claim the combination with the grooved india-rubber ring, the fasteners, and the vessel and its cover or lid, the whole arranged and combined substantially as herein set forth, of the flexible conductor pipe, C, secured to the said cover or lid by the screw joint, D.

67,417.—PUMP PISTON.—F. A. Cramblitt, Petroleum Centre, Pa., assignor to himself and Joseph B. Dickey.

1st, I claim making in separate parts the two ends of a piston for operating pumps in oil, salt, artesian or other deep wells, and attaching such parts to the piston rod in such a way that one or both may have sufficient vertical play on the rod to admit of the outward expansion or bulging of the piston-packing, substantially as and for the purposes described.

2d, Filling the contiguous ends of such half-piston to each other so as to leave room between them for the oil or water in the piston to pass out against and expand or bulge the piston-packing, substantially as and for the purposes above set forth.

3d. Packing a piston for deep well pumps by a packing sleeve of leather or other flexible material, in such a way that the ends of such sleeve shall be securely fastened beneath the outer surface of the upper and lower ends of such piston, so as to make therewith tight working joints, substantially in the manner and for the purposes above specified.

4th. Making the half-pistons described counterparts of each other, so as to secure a reversible piston, substantially as and for the purposes described.

67,418.—BUGGY-TOP JOINT AND FASTENING.—Henry M. Curtis, Ypsilanti, Mich.

I claim the main and counter braces, A and C, when combined or joined together, and operating conjointly with the carriage tops, substantially as and for the purpose set forth.

67,419.—APPARATUS FOR RAISING AND LOWERING SHIPS' BOATS.—William A. Devon, Richmond, N. Y. Antedated July 23, 1867.

I claim the combination of the davit, C, with its cross bar or beam, E, and blocks, D G G, arranged for operation together, in connection with the ropes of the two end tackles, and swinging from a common center, substantially as and for the purposes herein set forth.

67,420.—BED BOTTOM.—Henry Doebele, (assignor to himself and Peter Kries), Philo, Ohio.

I claim, 1st, Securing the ends of the slats, A A, between two plates or strips, B and E, and connecting the latter by means of metal elbow pieces, F F, and holding the whole bottom together by means of screws, C, substantially as set forth.

2d, Combining the above bed bottom with a bedstead, in which are rails, C, and springs, D, for the reception of the bottom, so that the latter can be placed upon the springs, and be securely held in the bedstead without being fastened to the same as set forth.

67,421.—MACHINE FOR MAKING NUTS.—George Dunham, Unionville, Conn.

I claim, 1st, Arranging the cams and hammers, K and K," so that the latter shall act in the double capacity of hammering the blank, and to push it to the punch, o, and from thence in front of the pusher, S, substantially as described.

2d, I claim constructing and arranging the cams and the hammers, K K' K," so that the latter shall act in the double capacity to hammer the blank and hold it until the punch, X, has entered the same, substantially in the manner described.

3d, I claim the combination of the lever, T2, and adjusting screws, a b, with the slide, M, substantially as and for the purpose described.

4th, I claim the employment of the yielding cam, U, in combination with the hammer, K, substantially as described.

5th, I claim the employment of the lifter, Q, for lifting the hammer, K, while it is pushing the nut off from the die, O, substantially as described.

6th, I claim the combination of the anvil block, J, with the hammers, K K K," punch, X, and die, O, substantially as and for the purpose described.

67,422.—BOOT AND SHOE HEELS.—C. Dyer, Jr., and Ellis Drake, Stoughton, Mass.

We claim the elastic studs, F, in the perforated plate, C, clamped by their heads, G, between such plate and the treading surface, B, of the boot heel by means of the center screw, D, fitting into the nut, E, upon the shank, I, all constructed and arranged as herein set forth for the purpose specified.

67,423.—SMUT MACHINE.—Peter T. Elting, Buffalo, N. Y.

I claim, 1st, The combination and arrangement of the revolving stone or iron head, C, with the stationary brush, D, substantially as described.

2d, The concave screen, h2, and brush, I, arranged and operating substantially as described.

3d, The air passages, O and O,' so arranged with reference to the conical fan, n2, and the fan that a current of external air will be drawn in by the action of the fan and pass through the descending sheet of grain for the purpose, and substantially as described.

4th, The double offset, l l', in the annular leg, for the purpose and substantially as herein described.

67,424.—PORTABLE PERCUSSION CAP PRIMER.—James K. Ely and Robert Cook, Franklin, Ohio.

We claim the combination of the spring, c, orifice, f, and lip, n, with the guides or flanges, o o, and box, b, in which the caps are fed forward to the delivery orifice by their gravity, substantially as and for the purpose specified.

67,425.—TEA KETTLES AND OTHER VESSELS.—Sheldon B. Everitt, (assignor to himself and J. H. Bartholomew), Ansonia, Conn.; assignors to Frederick G. G. Niedringhaus, St. Louis, Mo.

I claim a sheet metal kettle, sauce-pan, or similar deep vessel, whose sides and bottom are not only made seamless of one piece of metal, but which is also provided with a flanged bottom or pot, A, whose depth does not exceed that of the sides of the vessel, substantially as herein set forth.

67,426.—PROCESS OF CONVERTING CAST IRON INTO STEEL AND MALLEABLE IRON.—Friend P. Fletcher and Virgil W. Blanchard, Bridport, Vt.

We claim, 1st, Dispersing or reducing the molten metal to an atomic condition in the presence of the gaseous element or elements contained in the bath, substantially as and for the purpose specified.

2d, The forcible dispersion of a stream of molten metal into a globular or atomic condition when it comes in contact with a jet or jets of a gaseous element or elements, substantially as and for the purpose specified.

3d, The introduction of a secondary jet or jets of a gaseous element or elements, into the bath above, below or beyond the primary one, substantially as and for the purpose specified.

4th, The use of an inclined plane or its equivalent, within the bath, in combination with said bath, as and for the purpose specified.

5th, We claim a secondary furnace or its equivalent, for the purpose of heating the gaseous elements, substantially as and for the purpose specified.

6th, A gate or valve in the main trough or channel, in combination with said trough and the shallow channel and bath, substantially as and for the purpose specified.

7th, The employment or use of the necessary valves in the pipes leading from the boiler and receiver to the bath, for the purpose of regulating the flow of gaseous element or elements into said bath, substantially as and for the purpose specified.

8th, The use of any gaseous element or elements beside those contained in air or steam, used and applied substantially as and for the purpose specified.

67,427.—MODE OF PRESERVING EGGS.—P. Gaughran and L. Sweeney, San Francisco, Cal,

We claim treating eggs for preservation, substantially in the manner as herein described.

67,428.—BUCKLES.—George L. Gerard, New Haven, Conn.

I claim the herein described buckle as an article of manufacture.

67,429.—PUNCHING APPARATUS.—T. E. Harris, Green Bay, Wis.

I claim the improved punching apparatus substantially as herein described and for the purpose set forth.

67,430.—CULTIVATOR.—Samuel L. Heisey, West Donegal, Pa.

I claim the arrangement of the sliding plate, B, with its guide, c, recess, b, in combination with the lever, D, and springs, S x, all arranged and operating substantially in the manner and for the purpose specified.

67,431.—MACHINE FOR STRETCHING HIDES.—Theodore P. Howell and Charles P. Oliver, Essex, N. J,

We claim a machine for stretching hides or skins, having the bar, a, posts, b c and d, bar, e, screw, f and f', beam, g, and knee, h, arranged, combined and operating for the purposes and in the manner herein above described.

67,432.—INNER SOLES FOR BOOTS AND SHOES.—S. W. Huntington, Augusta, Maine.

I claim the improved inner sole for boots and shoes as composed of the woolen body, a, in combination with the sheet, b, of lead, in the manner and for the purpose as described.

67,433.—LIGHTER FOR VESSELS.—Orrin H. Ingram and Donald Kennedy, West Eau Claire, Wis.

We claim removably attaching lighters, B, to the hull of a boat, A, substantially as herein shown and described and for the purpose set forth.

67,434.—KNIFE CLEANER.—Insley Jewett, Boston, assignor to himself and John P. Jewett, Hyde Park, Mass.

I claim the combination and arrangement of the strips of leather, E F, the piece of india-rubber, C, and the compression screw, e or its equivalent, with the emery receptacle formed of the plates, A B I i, as described.

I also claim the combination of the slotted mouth piece, G, with the strips E F, the piece of rubber, C D, and the plates, A B I i, arranged as specified.

67,435.—BROILERS.—Henry H. Johnson, New Haven, Conn.

I claim a broiler, A, constructed with an arm, C, provided with one or more shoulders, a b c, and so as to operate substantially as herein set forth.

67,436.—ADJUSTABLE BOLSTER FOR MATTRESSES.—Phillip Kraher, Cincinnati, Ohio.

1st. I claim the adjustable bolster, B, operating on hinge, I, with the segment or plate, C, for the purpose as herein set forth.

2d, The cord, D, the pulley, F, the pins, E, the staples or frames, D, the springs, C, all made and combined that both sides of the bolster may be operated at the same time.

67,437.—FEATHERING PADDLE WHEEL.—George A. Keene, Newburyport, Mass.

1st, I claim the arrangement in a paddle wheel of independent floats, having each one wing preponderating in area and weight, pivoted to cross bars, D and E, so as to allow a reciprocating rotary motion through a limited arc, substantially as and for the purpose described.

2d, And the further arrangement of stop, F, in connection with floats having such a preponderating side, and pivoted to cross bars, D and E, substantially as described and for the purpose of limiting such reciprocating rotary motion.

67,438.—LUBRICATOR.—Samuel Lemon, Jr., Hoboken, N. J., assignor to himself and Charles Woodruff, Hunter's Point, N. Y.

I claim the combination and arrangement of the globe, A, tube, B, nut, c, rod, c, with valve, F, and caps, D D', substantially as described for the purpose specified.

67,439.—BRICK MACHINE.—W. O. Leslie, Philadelphia, Pa.

1st, I claim the mold carriage u, constructed and operating substantially as shown and described.

2d, The pressure plate l, constructed and operating substantially as shown and described.

3d, The track z, constructed and operating substantially as shown and described.

4th, Making the under side of the pressure plate l, convex, and the upper part of the mold carriage u, correspondingly concave, substantially as shown and described.

67,440.—MODE OF SECURING RUBBER ROLLS TO THEIR SHAFTS.—Charles Manhoim (assignor to himself and E. L. Perry), New York City.

I claim a rubber roll having its inner packing of cloth and rubber, wound spirally upon and vulcanized to the shaft, together with its casting, as herein set forth, whereby the rubber is prevented from turning upon the shaft or packing, substantially as described and for the purpose specified.

67,441.—CORN CULTIVATOR.—Albertis Martin, Oquawka, Ill., assignor to himself and J. B. Martin. Antedated July 27, 1867.

1st, I claim the plow frame C, when supported by the rollers m and n, and the arrangement with reference to the frame A, axle B, and the plow beams, D and E, in the manner substantially as described and for the purpose specified.

2d, The semicircular cog wheel I, shaft Y, lever K, crank L, and bar F, in combination with the cog bar H, attached to the frame C, substantially as described and for the purpose specified.

3d, The connecting piece t, in combination with the straps attached to the post F, and beam D, substantially as and for the purpose set forth.

67,442.—BED BOTTOM.—Sam. McDonald, Cincinnati, Ohio.

I claim the supporting rods F, and elastic loops E, sustained by either a firm or a yielding attachment to the bedstead, and operating substantially in the manner and for the purpose set forth.

67,443.—RAILROAD SWITCH.—James McLaughlin and Chas. W. Jones (assignors to themselves and Wm. C. King), Duncannon, Pa.

We claim an elastic self-acting railroad switch, arranged and operating substantially as herein described.

67,444.—CORN PLANTER.—H. S. Mitchell and C. Search, Hublersburg, Pa.

We claim, 1st, The removable slide plate applied to and operating in connection with the reciprocating slide, substantially as and for the purpose described.

2d, The removable slide plate I', provided with the rib or ridge i, arranged to work in a corresponding groove formed in the partition F, in the manner and for the purpose set forth.

3d, The arrangement of the levers N, and rack bar O, in connection with the adjustable followers or coverers, substantially as described.

4th, The reciprocating rod b, provided with the star-shaped burr or head c, and adapted by the reciprocating slide I, in the manner and for the purpose described.

67,445.—FURNACE FOR ROASTING ORES.—David Jones O'Harra and Clark Brown Thompson, Empire City, Nevada.

1st, We claim the combination and arrangement of the hinged circular plate E E', with the inclined oblique hoes, a a a a, all constructed as shown and attached to the endless chain D, substantially as and for the purpose specified.

2d, The arrangement of a series of fire chambers, G G, along the sides of the ore chamber of a desulphurizing furnace at intervals of about twenty-five feet, substantially in the manner and for the purpose set forth.

67,446.—FENCE POSTS.—David Oliver, Oxford, Ohio.

I claim a fence post consisting of two uprights A A, firmly attached to a stone B, by means of a link G, substantially as described.

67,447.—MANUFACTURE OF AMMONIA.—Alfred Paraf, Thann, France.

I claim the process of preparing purified ammonia from ammoniacal stock by distillation, and treating the products by charcoal, substantially as herein before set forth.

67,448.—TRACE BUCKLE.—C. B. Payne, Bloomington, Ill.

I claim the combination of the buckle A B S, lock E, trace F G, having headed bolts P, arranged to pass through slots D C, and operate substantially as set forth.

67,449.—MACHINE FOR DRESSING AND RENOVATING FEATHERS.—G. W. Peabody, East Hampton, Mass., and O. L. Cowles, Westfield, Mass.

1st, We claim the use, in combination with a steam cylinder M, of a feather-dressing machine, of one or more similar valve seats, each having several steam passages radiating therefrom and opening into the space L, substantially as described.

2d, Operating all the steam valves in the cylinder M, by means of a single valve rod arranged within the cylinder, substantially as and for the purposes set forth.

3d, The combined valve key and steam plug, constructed and operating substantially as described.

4th, The arrangement of the drip pipes, placed as described, in combination with the steam cylinder and hollow-flanged bearings, substantially as set forth.

67,450.—ARTIFICIAL FERTILIZER.—Henry E. Pond, Franklin, Mass.

I claim the new fertilizer substantially as before described.

67,451.—METHOD OF SPLICING RAILROAD RAILS.—Daniel R. Pratt, Worcester, Mass., assignor to John P. Verree, Wm. A. Mitchell, and J. Marcus Rice.

1st, I claim the method and arrangement of joining the ends of two railroad rails by the means of springs F, cups E, washers D, bolts B, and nuts C, in combination with two splicing plates A A, made in the manner substantially as described and for the purposes herein set forth.

2d, I claim the construction and arrangement of springs combined with the wooden splicing plates, as shown in Fig. 2, as and for the purposes herein set forth.

67,452.—BOILER.—Joshua R. Purdy and D. C. Barger, Peekskill, N. Y.

1st, We claim the arrangement and combination of the outer pot A, and inner pot B, with legs L L, and projections r r, substantially as set forth.

2d, The double cover C c, attached together by the hooks or standards s s, and eyes e e, or some equivalent device.

3d, The valve V, placed in the cover of the inner pot B, for the purpose of allowing the escape of steam and odor.

4th, The arrangement and combination of the pots A and B, covers G and C, substantially as and for the purposes set forth.

67,453.—WASHING MACHINE.—John F. Riggs and Wm. M. Albin, St. Joseph, Mo.

1st, We claim operating the plunger E, through the medium of the pivoted frame C, connecting rod D, and crank e, of the shaft d, substantially in the manner and for the purpose set forth.

2d, The wheel B, in combination with the legs a a, formed of two parts, connected by a joint or hinge b, substantially as and for the purpose specified.

67,454.—PLATFORM SCALES.—S. E. Robbins (assignor to Elmer Townsend), Boston, Mass.

I claim the construction of the knife-edge bearings throughout the scale, with concave edges fitting upon convex surfaces, as and for the purpose substantially as set forth.

67,455.—DISINTEGRATING FLAX, HEMP, AND OTHER FIBROUS PLANTS.—R. M. Russell, New York City, assignor to George W. Norris, Baltimore, Md.

1st, I claim the process of disintegrating fibrous substances, substantially as herein specified, that is to say, by subjecting the said substances, whilst in a boiler or other suitable vessel, to the action of steam or superheated steam, followed by cold atmospheric air or carbonic acid gas, or both together, producing results substantially as herein specified.

2d, Treating the substantially disintegrated mass, whilst in the disintegrating boiler or other vessel, with the chemical agents herein specified, or their equivalents, in substantially the manner herein specified.

67,456.—PLOW.—Elias Seward, Hamilton, Ohio.

I claim the self-adjusting plow B, made with the convex shoe C, having the angular horizontal base d d e e, and curved receding shank h, as a new article of manufacture, constructed and operating in the manner and for the purpose substantially as described.

67,457.—FURNACE.—Joseph Sholl, Burlington, N. J.

1st, I claim the combination of a boiler or oven with a fire box enclosed in an air chamber, and a flue or passage through which heated air from the said chamber is caused to traverse in contact with those parts of the boiler not heated directly by the products of combustion from the fire-place, all substantially as and for the purpose described.

2d, The combination of the above and a flue for conveying the air after its passage round the boiler or oven to the fire-place.

67,458.—CARPENTER'S PLANE.—G. D. Spooner, Rutland, Vt., and L. N. Johnston, Brandon, Vt.

We claim the sliding crosshead C, provided with shoulders b, which bear against the inner surface of the plate B, said crosshead being made to receive the set screw c, and the thumb screw E, which catches in a forked lug d, projecting from the inner surface of the fixed plate B, to operate in combination with the plane iron D, as and for the purpose described.

67,459.—CLOTHES-LINE REEL.—J. D. Starritt, Chicago, Ill.

1st, I claim the combination of two part box A B, with spools F, shaft K, and cord G, substantially as set forth.

2d, The combination of locks r s, shaft K, and two-part box A B, arranged to hold said shaft K, when said box A B, is shut, and loosen it when open, as set forth.

3d, The ratchet wheel m, in combination with pawl P, spools F, and catch, as described.

67,460.—SAFETY COCK.—John Stowell, Charlestown, Mass.

I claim the safety cock, made substantially as described, viz., of the body A, the valve and its seat, the fusible plug, the auxiliary stem and its screws, or the equivalents thereof, the whole being as and for the purpose specified.

67,461.—DUST BRUSH.—Samuel Taylor, Boston, Mass.

1st, I claim, as a new article of manufacture, the floor brush or duster formed in its interior of knots of bristles, and edged with a continuous sheet of bristles, substantially as and for the purpose described.

2d, The method, substantially as described, of edging a brush with a continuous sheet of bristles.

67,462.—INSTRUMENT FOR SETTING JEWELS.—Augustin Thoma, Augustin F. Thoma, and Albin Thoma, Piqua, Ohio.

1st, We claim the spring jaws b b, in combination with the spreading rod d, connected with the handles a, constructed and operating substantially as and for the purpose herein described.

2d, We claim the notch h, on the point of one of the jaws b b', formed for the purpose herein specified.

67,463.—METHOD OF CAPPING AND NICKING THE CAPS OF SCREW HEADS.—Charles E. Thompson (assignor to himself and Orrin W. Swift), New Haven, Conn.

I claim the method of capping the heads of screws and nicking the caps, substantially as herein described.

67,464.—TOOL EXTRACTOR.—R. S. Torrey, Bangor, Me.

I claim the worm c, in combination with the cylinder A, and the sliding arrangement B E C, in the manner and for the purpose described.

67,465.—WINDOW-SHADE FIXTURE.—L. A. Tripp (assignor to himself and S. M. Boyd), Middletown, N. Y.

I claim the combination of the cap E, sliding bolt F, and notched ring G, with each other, substantially as herein shown and described and for the purpose set forth.

67,466.—HARROW.—John E. Van Riper, Dearborn, Mich.

1st, I claim the folding draft bar H, constructed with hinges or other joints, for the purpose described.

2d, The combination and arrangement of the three sections A B C, the link couplings I I and O O, etc., and the folding draft bar H, arranged substantially as described for the purpose designed.

67,467.—SHAMPOOING MIXTURE.—M. J. Vieira, Mendota, Ill.

I claim a composition of a liquid for use in shampooing the hair, compounded of the ingredients substantially as set forth.

67,468.—CAR COUPLING.—Wm. E. Warner, Newark, N. J., and M. J. Palmer, Syracuse, N. Y., assignors to themselves and Arthur Holmes.

We claim the self-locking car coupling, constructed and operated substantially as described in the foregoing specifications.

67,469.—LUBRICATOR.—G. Waters, Cincinnati, Ohio.

I claim a lubricator consisting of the glass reservoir, A, attached to the stem, D, by means of the socket, C, and the elastic packing, B, all constructed and arranged to operate as shown and described.

67,470.—PULLEY.—Thomas A. Weston, Birmingham, Eng.

I claim the aforesaid double chain wheel and endless chain combined in the manner described and represented in the drawing.

67,471.—LIGHTED VENTILATOR FOR SHIPS.—Norman W. Wheeler, Brooklyn, N. Y.

1st, I claim the combination of the glass top, C, and the hood, B, or their equivalents, substantially as described.

2d, I claim the hinged deflecting doors, E E, in combination with the hood, B, provided with a glass top, substantially as described.

67,472.—SASH FASTENING.—M. V. B. White, Ballston, N. Y.

I claim the employment of the lock or stop, C, operating in the recess or mortise, D, cut in the window sash, B, and in combination with the arm, I, and roller, F, in the manner and for the purposes substantially as hereinbefore fully described and set forth.

67,473.—VARIETY FRAME LATHE.—A. C. Wicker, and Lorson W. Williams, Fairhaven, Vt.

1st, We claim the combination of the sliding frame, C, with the standards, B, and the shaft, F, substantially as herein shown and described and for the purpose set forth.

2d, The patterns, I, constructed and secured to the shaft, F, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the upright bearings, J, with the bed plate, A, and patterns, I, attached to the shaft, F, substantially as herein shown and described and for the purpose set forth.

Fourth, The combination of the spring, K, or its equivalent with the sliding frame, C, and bed plate or frame of the machine, substantially as herein shown and described and for the purpose set forth.

67,474.—MILK CAN BOTTOM.—Moses Wiles and J. C. Wock, Fort Plain, N. Y.

We claim the bottom, C, formed of either cast or wrought iron or other material substantially as shown and described in combination with a milk can as and for the purposes set forth.

67,475.—PRINTING PRESS.—B. O. Woods, and W. S. Tuttle, Boston, Mass.

1st, We claim adjusting the tympan with reference to the type bed by appliances as w, the lower end of arms, d, without intending to limit ourselves to the particular appliances shown, substantially as described.

2d, The arrangement of the crank arms, d, and screws, K, in combination with the tympan, and bed plate, substantially as described.

67,476.—PISTON PACKING.—E. B. Allen, Portland, Me.

I claim, 1st, In combination with the part, g, of the piston the arrangement of the segments constructed at p o, and the segments, as shown at q r, in the manner and for the purposes herein described,

2d, In combination with the part, g, of the piston, the arrangement of the segments, p', o', having the channels, t, on the part, p' and the segments, q' r' having the lips to fit into the said channels, t, in the manner and for the purposes described.

67,477.—CHIMNEY CAP.—Michael Anderson, Brooklyn, N. Y.

I claim, 1st, The spiral revolving wings, E, overlapping each other and leaving an open space, F, between them in combination with the cylindrical casing, B, disk, D, and central tube, G, as herein set forth for the purpose specified.

2d, The spiral flanges, G, constructed as described causing a downward circular motion to the atmosphere surrounding the central tube, G, in such a manner as to form a vacuum at its top, thereby increasing the draft of the chimney as herein shown and described.

67,478.—STEAM CYLINDER LUBRICATOR.—E. H. Ashcroft, Lynn, Mass.

I claim, 1st, The combination of the valve, E, cup, A, tube, C, and inner valve, D, constructed, arranged and operating in the manner substantially as shown and described and for the purpose set forth.

2d, The combination of said parts with outer cup, F, arranged, constructed and operating in the manner substantially as shown and described and for the purposes set forth.

67,479.—STEAM GAGE COCKS.—E. H. Ashcroft, Lynn, Mass.

I claim, 1st, The handle, F, constructed in the manner substantially as shown and described and for the purpose set forth.

2d, The combination of handle, F, stem, B, disk, H, spring, d, gage cock, A, bearings, I I, and valve, C, constructed, arranged and operated in the manner, substantially as shown and described.

67,480.—MACHINE FOR GRINDING SAWS.—E. C. Atkins, Indianapolis, Ind.

I claim, 1st, The combination and arrangement of the grindstone, K, and shaft, M, collar, N, adjustable boxes, I, with pins, K' and set screw, O, with the reciprocating bed, G, supported upon rods, u, and springs, t, substantially as and for the purpose set forth.

2d, In combination with the bed, G, rods, u, and springs, t, I claim the carriage, F, and way frame, E, adjustably supported at one end upon the screws, B, substantially as and for the purpose set forth.

67,481.—COTTON SEED PLANTER.—W. C. Banks, Como Depot, Miss.

I claim the seed box, I, having the form herein described and provided with openings, c c, in combination with the finger, g, and guiding box, or hopper, F, when arranged and operating in the manner and for the purpose specified.

67,482.—SPRING BALANCE.—W. G. Barker, Detroit, Mich.

I claim a spring balance having its spring, C, connected at one end to an adjusting screw, B, by means of a swivel connection so that said spring can be more or less extended by turning said screws, substantially as and for the purpose described.

67,483.—GANG PLOW.—Robert Baxter, French Camp, Cal.

I claim the head piece or flange in combination with and forming part of the standard in the manner and for the purpose set forth.

67,484.—THILL AND POLE COUPLING.—Edwin Bennett, Oxford, Mich.

I claim the bar, B, which is passed under the axle and spread at its forward part to form a spring for sustaining the egg-shaped shaft iron by means of the bolt and screw, E, for the purpose set forth.

67,485.—CHAIR SEAT.—Alanson Bingham, Surry, N. H.

I claim, 1st, The combination of the splint, A, slotted splint frame, D, and strips, E, or frame, F, for combining the ends of the splint, substantially as described.

2d, The combination of the flanged chair seat frame, F, and double reversible seat frames, substantially as and for the purpose set forth.

67,486.—LOOPS FOR BEARING CHAINS.—James Bird, New York City.

I claim making bearing chains with a hollow head, E, so as to receive and hold an elastic cushion, F, substantially as above shown.

67,487.—ADJUSTABLE PARALLEL RULER.—Edward Bostock, Albany, N. Y.

I claim, 1st, The employment in parallel rulers of an adjustable slide having a straight supporting edge thereon, as and for the purpose described.

2d, The combination with such adjustable straight supporting edge one or more guides or rods as and for the purpose set forth.

3d, In combination with such adjustable straight supporting edge one or more guides or rods having knobs or heads thereon as and for the purpose set forth.

4th, Such adjustable straight supporting edge when provided with a graduated scale thereon as and for the purpose set forth.

5th, The combination of the laths, A and B, with the rods, or bars, C C, for the purpose set forth.

6th, The combination of the laths, A and B, rod or rods, C, and the straight supporting edge as and for the purpose set forth.

7th, Providing the guide rods with removable heads to admit of reversing the ruler relatively to a bar, B, so as to place its beveled edges against or away from the material to be ruled for the purpose set forth.

67,488.—SLATE PENCIL SHARPENER.—F. G. Bottner, Bridgeport, Ct.

I claim as an improved article of manufacture, a slate pencil sharpener made and operating substantially as and for the purpose herein shown and described.

67,489.—TUG HOLDER.—T. J. Bottomley, Burlington, Wis.

I claim a holder for tugs or traces, of harnesses constructed and applied to harnesses, substantially as and for the purpose described.

67,490.—HARVESTER.—W. F. Brabrook, South Hardwick, Vt.

I claim the construction and arrangement of the jointed bars, E F, sickles, K K, of unequal length, foot lever, G, chain, b, toothed segment, I, lever, J, pawl, c, on the lever shaft, f, in the bracket, c, substantially as described for the purpose specified.

76,491.—EYELET.—G. B. Brayton, Providence, R. I.

I claim an eyelet made from metal composed of the elements and possessing the characteristics, substantially as described.

67,492.—APPARATUS FOR THE COMBUSTION OF FUEL.—Jacob Bär, Munich Kingdom of Bavaria.

1st, I claim the employment of solid fuel in a fine state of division and causing it to ignite during its descent through a suitable combustion chamber to which it is supplied in a continuous manner by self-acting feeding apparatus, substantially as and for the purpose hereinbefore described.

2d, The application and use to and in the combustion chambers hereinbefore referred to of stops or obstructions for the purpose of checking or retarding the descent of the finely divided fuel through such chambers and insuring thereby its complete and perfect combustion.

3d, The substitution of an exhaust fan for the usual chimney for creating a current or currents of air through the combustion chamber hereinbefore referred to when such fans are worked in concert with the several fuel feeding apparatus, substantially as hereinbefore described.

67,493.—SPLINTS.—J. L. Burch, Franklin, Tenn.

1st, I claim the mode substantially as herein described of constructing and arranging the reversible splints, A A' A2 and of attaching the same to the injured limb.

2d, The combination of splints, A A1 A2 and D, respectively constructed substantially as set forth.

3d, In combination with the vertical splints, the adjustable sole, E, attached thereto and to the foot, substantially as described.

67,494.—ELEVATED BEDSTEAD.—D. Burnett, Bedford Station, N. Y.

I claim the combination of a bedstead which can be raised or lowered by the devices, substantially as described with the sliding legs, as herein set forth for the purpose specified.

67,495.—APPARATUS FOR STRAIGHTENING SHEET METAL.—Joseph D. Carter, Thomaston, Conn.

I claim the arrangement of a series of rollers in the manner described, by means of which a sheet of iron may be subjected to a series of gradually diminishing bendings as set forth.

67,496.—STEAM ENGINE OIL CUP.—Thomas Chatterton, Cleveland, Ohio.

I claim the plug, E, provided with ports, I J and e, ports, a f, and vent holes, g, as arranged and in combination with the cup, a, for the purpose and in the manner set forth.

67,497.—FURNACE FOR OXYDIZING ORES.—Thomas J. Chubb, Brooklyn, N. Y.

1st, I claim the combination of a revolving cylinder, which is provided with elevating strips or buckets, with a furnace which is constructed with a receptacle for receiving the ore from said cylinder, substantially as described.

2d, The construction of the cylinder, D, with a contrivance for grinding or crushing the ore as it flows thereform, substantially as described.

3d, The combination of cylinders, E D E, substantially as described.

4th, The receiving hopper, G, and furnace chamber, B, with an elevator, I, and a revolving cylinder, in combination with a suitable furnace, all arranged so as to operate substantially as described.

5th, The construction of the furnace for heating the ore, of a fire chamber, A, flues, b c d, chambers, A1 A2 and B, damper openings, g h, substantially as described.

6th, Providing for conducting the products of combustion into or through the ore treating chambers, or directly off through pipe, P, at pleasure, substantially as described.

7th, Inclining the cylinder, D, toward the furnace so as to effect the return of the ore after each treatment to the receiving hopper, G, substantially as described.

8th, The receiver, H, in combination with a cylindrical screen, E, substantially as described.

9th, The tilting trough, J, in combination with a return spout, L, leading down to the receiver, G, substantially as described.

10th, The arrangement of a series of disconnected pipes, c c d d b b, with relation to the furnace chamber, A, hot air chamber, B, substantially as and for the purpose described.

11th, So constructing an apparatus for treating ore substantially as described, that the operation or treatment can be repeated as often as desired without handling the ore, substantially as described.

67,498.—AMALGAMATORS.—T. J. Chubb, Brooklyn, N. Y.

1st, I claim the employment of a revolving cylinder in combination with hollers, stirrers or agitators, for conveying and stirring ore containing precious metals, which ore is being subjected to the action of the vapor of mercury, substantially as described.

2d, The employment of a revolving shaft with stirrers or projections on it, for stirring, conveying and exposing ore containing precious metal, and while such ore is being exposed to the vapor of mercury, substantially as described.

3d, The arrangement of a condenser, in combination with a mercury still and contrivances for exposing the ore to the action of the vapor of mercury, substantially as described.

4th, Producing a partial vacuum in a mercury retort and appurtenances of an apparatus for amalgamating precious metals, by means of a pump, chimney or their equivalents, substantially as described.

5th, The outer casing or housing for enclosing an apparatus in which the vapors of mercury are used for amalgamating precious metals, substantially as described.

6th, Providing for collecting the vapor of mercury on its way from the amalgamator to the escape-flue or chimney, substantially as described.

7th, Heating the amalgamating chamber in which the vapors of mercury and precious metals are contained, by heat applied upon the outside of the chambers, so as to prevent a too sudden condensation of the mercury upon the inside of said chambers.

67,499.—WASHING MACHINE.—J. B. Coffin, Ashland, Ohio.

1st, I claim the combination of the block, D, board, E, posts, F, board, G, and lever, H, with each other and with the tub, A, substantially as herein shown and described, and for the purpose set forth.

2d, The collar, k, constructed and shown as described in combination with the handle, l, and side pieces, h', of the lever, H, substantially as and for the purpose herein set forth.

3d, The combination of the rubber or equivalent spring, L, with the board, G, and lever, H, substantially as herein shown and described and for the purpose set forth.

4th, Attaching the handles, M, to the lever, H, by means of a rubber or equivalent spring, n, substantially as herein shown and described and for the purpose set forth.

67,500.—CAST IRON BELL.—E. G. Cone, East Hampton, Conn.

I claim a cast iron bell having its shank, B, of malleable cast-iron or other soft metal capable of being drilled, with the body, A, of the bell cast around it, substantially as herein shown and described.

67,501.—GANG PLOW.—Allen T. Covell, San Leandro, Cal.

1st, I claim attaching the beams, A A, to the pole, B, between the reaches, a a, by the rod, C, so that the plows may be made to move up and down swinging on the axle, J, and rod by operating the lever, G, when disengaged, substantially as described.

2d, Attaching the axle, J', and axle bed, J, angularly to the frame, the clips, K K, and adjusting blocks, l l, substantially as described and for the purposes set forth.

3d, The links, D D, attached to the beams or frame and the rigid arms, E E, of the roller operating in them in combination with the beams, A A, and pole, B, substantially as described.

4th, The combination arrangement and combination of the beams, A A, pole, B, reaches, a a, rod, C, axle and axle-bed, J and J', temper blocks, l l, roller, F, and arms, E E, together with links, D D, substantially as described and for the purposes set forth.

67,502.—PATTERN FOR CASTING STEAM PIPE SUPPORTS.—Richard T. Crane, Chicago, Ill.

I claim, in combination with the main pattern, A, one or more pivoted hook patterns, B, arranged and operating substantially as and for the purposes herein specified.

67,503.—STEAM HEATER.—Richard T. Crane, Chicago, Ill.

I claim the combination and arrangement of the headers, B C, and pipes, P, with a steam inlet, A, at the bottom, as and for the purposes described.

67,504.—STEAM HEATER.—Richard T. Crane, Chicago, Ill.

I claim in combination with a series of coils, P, and the headers, B C D, the arrangement of the steam inlet pipes, a b, substantially as and for the purposes specified.

67,505.—STEAM GENERATOR FOR HEATING PURPOSES.—Richard T. Crane, Chicago, Ill.

1st, I claim the arrangement of movable bars, R, in combination with stationary water grate bars, substantially as and for the purposes specified.

2d, I claim the combination and arrangement of the vertical headers, G, and the horizontal pipes, L, substantial as specified and shown.

3d, I claim the combination of the water grate bars, F, with said headers, G, and pipes, L, arranged and operating substantially as specified and for the purposes described.

4th, I claim the arrangement of the pipe or pipes, K, with the pipes, J, and headers, I I, substantially as and for the purposes specified.

5th, I claim the arrangement of the heads, M, when constructed so as to form a water drum for condensed steam, as set forth and described.

6th, I claim the arrangement of the pipes, N, with the receiver, O, so as to form a drip for the condensed steam in said reservoir, and in combination with the pipe, P, substantially as and for the purposes specified.

7th, I claim the combination of the three systems of pipes, F J and L, when connected and arranged in the manner herein set forth and shown and for the uses specified.

8th, I claim the arrangement of a series of scrapers, Y, in combination with a series of horizontal pipes, L, as and for the purposes specified and shown.

67,506.—LOW WATER ALARM FOR STEAM GENERATORS.—Richard T. Crane, Chicago, Ill.

I claim the arrangement of the pipes, B B, and tie, D, with respect to the valves, B, substantially as and for the purposes specified.

67,507.—PAD TREE.—Andrew J. Cronk, Peoria, Ill.

I claim the pad iron as constructed and combined with the bridge, substantially in the manner and for the purpose as herein set forth.

2d, The bridge constructed with D's and combined with the pad iron substantially in the manner and for the purpose as herein set forth.

67,508.—HORSE COLLAR.—Andrew J. Cronk, Peoria, Ill.

1st, I claim constructing a wooden collar combined with metallic bands, nails, and bolts, substantially in the manner and for the purpose as herein set forth.

2d, Constructing a wooden collar with sockets and key plates combined with trace or tug clips, substantially in the manner and for the purpose as herein set forth.

67,509.—BRIDLE BIT.—Oliver Crook, Dayton, O.

I claim the bridle bit, A, having a stiff bitmouth, with rings, B B, rigidly attached at either end, and the anterior portion of these rings having orifices through the center for a strap connecting the driving reins to the headstall, substantially as and for the purpose described.

67,510.—LANTERN.—James E. Cross, Chicago, Ill.

I claim, 1st, The construction of the oil cup with the socket, so that it may be used for oil or with a candle, substantially as herein recited.

2d, I claim the combination of the space, i, of the flange, h, and the catches, j, for attaching the oil cup to the bottom of the lantern.

67,511.—OSCILLATING ENGINE.—Marcellus V. Cummings, Winthrop, Me.

I claim the combination as well as the arrangement of the trunnion passages, o p, with the cylinder ports, q r, and the box, B, and its induction and eduction passages or pipes, o s.

I also claim the combination as well as the arrangement of the two cocks, h i, and the conduits, f g u v, with the conduits, d s, the box, B, the trunnion, a, its passages, o p, and the ports, q r, of the cylinder, the whole being to operate substantially as specified.

67,512.—MODE OF FERMENTING LIQUIDS FOR DISTILLATION AND OTHER PURPOSES.—E. d'Heureuse, San Francisco, Cal.

I claim the introduction of air or the proper temperature into the fermenting substance from below, for the purpose of more thoroughly fermenting the whole mass, and to control the progress of fermentation, substantially in the manner described and set forth.

67,513.—PLOW WHEEL.—Geo. Dodge, Kalamazoo, Mich.

I claim, 1st, A gage wheel for a plow having its hub, B, and axle, C, cast with a chill, for the purpose set forth.

2d, The recess, d, in the exterior of the hub, B, of the wheel, in combination with the slit or slot, e, in the socket, a, substantially as and for the purpose specified.

3d, The combination of the cap, b, with the socket, a, applied to the hub, B, of the wheel, and secured thereon substantially in the manner and for the purpose set forth.

67,514.—STARCH ELEVATOR.—Andrew Erkenbrecher, Cincinnati, O.

I claim the arrangement of ascending endless apron, E, trestle, G, and return trough, J, as and for the purpose set forth.

67,515.—STARCH MAKING APPARATUS.—Andrew Erkenbrecher, Cincinnati, O.

1st, I claim a starch making establishment or factory whose containing vessels and floor are composed wholly or chiefly of cement or masonry, having suitable ducts, gutters, etc., and being formed and arranged substantially as and for the purpose set forth.

2d, Constructing the various receptacles, etc., of a starch factory of stone, marble, or cement, or any two or more of these combined, substantially as and for the purpose herein described and explained.

67,516.—STARCH AGITATOR.—Andrew Erkenbrecher, Cincinnati, O.

I claim the starch agitator composed of gravitating bars, F, loosely connected to a revolving vertical shaft, substantially as and for the purpose set forth.

67,517.—SPIDER OR FRYING PAN.—A. B. Fales, Troy, N. Y.

I claim as a new article of manufacture a spider constructed substantially in the manner and for the purposes herein described and set forth.

67,518.—LATCH AND CATCH.—Jerome B. Farmer, Indianapolis, Ind.

1st, I claim latch bar, B, pivoted between two plates, as shown, in combination with the lock stop, C, when these are used in conjunction, as set forth and for the purposes declared.

2d, A double-jawed catch, the upper jaw serving as the catch proper, while the lower jaw is a tripping incline, to throw the latch into the recess of the catch when a gate or door is shut quick, all as set forth in the foregoing.

67,519.—THREADING AND REGULATING TENSION OF THREAD IN WEAVING AND BRAIDING MACHINES.—Jesse Fowkes, Newton, Mass.

I claim the hook, F, in combination with the hollow cup, H, operated substantially as described for the purpose set forth.

67,520.—MACHINERY FOR CUTTING KEY SEATS.—Daniel Flynn, Hartford, Ct.

1st, I claim the combination of the centering chucks, A A', the tool shaft, E, the tool, K, the slide, L, and the screws, s and s', or their equivalents, for the purposes of a machine for cutting key seats, substantially as herein described.

2d, I claim the slide, L, in combination with the screws, s and s', and reciprocating shaft, E, for raising and feeding the tool, K, substantially as herein described.

67,521.—BED BOTTOM.—Henry A. and Amos Follett, Smithfield, R. I.

1st, We claim a bed bottom composed of two sets of spring bars, e e', in alternation, one end of the bars of each set being held fast and the other end left free to spring, and arranged so that one half, or nearly so, of such bars will have their springing ends at the head and the residue at the foot of the bedstead, all of such bars, being combined with a transverse rail, B, or other suitable fixed support for the same, the improvement being substantially as herein described.

2d, A bed bottom constructed and arranged as above described, in combination with a slat frame, C, or other proper support for the mattress, substantially as described.

67,522.—CULTIVATOR.—John Frank, Webster City, Iowa.

I claim a cultivator or shovel plow having the leg, A, staple, B, strap, C, staples, D D, hook, E, and staple, F, arranged, combined, constructed, and operating substantially as described.

67,523.—HORSE RAKE.—Levi W. Frederick, Gosport, Ind.

I claim, 1st, The arrangement of the thills, A A, the double cross bar, B, and the outside hounds, C C, in combination with the rings, a a, and the short axles, b b, of the driving wheels, D D, constructed and forming together a compact, light and strong body for attaching a horse hay rake, as herein described.

2d, The adjustable rings, a a, in combination with the axles, b b, and the hounds, C C, arranged and operating as herein set forth.

3d, The swinging draft bars, e e, in combination with the hounds, C C, the adjustable guides, d d, and the rake head, E, arranged and operating as herein described.

67,524.—THREAD GUIDE FOR SEWING MACHINES.—H. E. Fröhlich, Easton, Pa.

I claim the wires, B E and F, when arranged substantially as and for the purpose herein shown and described, in combination with the jaws, C, and set screw, D, all to be applied to the buttonhole sewing machine as set forth.

67,525.—DOOR SPRING.—Henry S. Frost, Watertown, Ct.

I claim, 1st, The combination of the spring, C, bar, E, and friction roller or pulley, G, with each other and with the door, A, and door frame, B, substantially as herein shown and described and for the purpose set forth.

2d, Connecting the rear ends of the spring, C, and bar, E, to each other by an eye or link, F, substantially as herein shown and described and for the purpose set forth.

67,526.—STREAM FENCE.—John Fryling, Fletcher, O.

I claim the two sills, the curved timbers or anchors, and the slats, as set forth in the drawings and specifications.

67,527.—ROTARY STEAM ENGINE.—Mathias Gabriel, Newark, N. J.

I claim the sliding abutments, E E', when connected by the yoke or bar, F, and operated simultaneously by the cam, G, on the axis of the rotating piston, D, substantially as and for the purpose set forth.

67,528.—LEAD HOLDER OR PENCIL.—Peter Gabriel, Seymour, Conn.

I claim the combination of the outer and inner tubes, A and B, respectively and stationary center stem or plug, C, substantially as and for the purpose described.

67,529.—COCOA NUT CUTTER AND GRATER.—John Gardner, Philadelphia, Pa.

I claim 1st, the hollow cylinder, D, provided with a perforated periphery to form a grater in combination with the knives, E, and cutters, c, at one end of the same arranged in the manner substantially as and for the purpose set forth.

2d, The hoppers, G H, on the top or cover, F, of the box in combination with the hollow cylinder, D, with its knives and cutters at one end and its perforated periphery, all arranged substantially as and for the purpose specified.

67,530.—TUBE CUTTER.—Henry Getty, Brooklyn, N. Y.

I claim a tube cutting implement provided with a V-shaped cutter, B, operating in combination with the two supporting rollers, E E, all constructed and arranged substantially as shown and described.

67,531.—HYDROSTATIC PRESS.—Charles Graham, Kingston, Pa.

I claim 1st, the combination of the reservoir, C, stationary press ram, D, and pump, E, arranged within said ram as described with a space between it and the latter for collection of sediment or dirt substantially as herein set forth.

2d, The arrangement of the relief valve, d, relatively to the pump, E, ram, D, and ram, F, for operation essentially as described.

67,532.—MOSQUITO NET FRAME.—W. A. Griffeth, Boston, Mass.

I claim the arrangement and combination of the hinge and wire frame in connection with the wire frame held by the socket as applied to a bedstead substantially as described.

67,533.—FEEDING ATTACHMENT FOR COTTON GINS.—S. Z. Hall, (assignor to himself and O Washburn), Camden, N. J. Antedated July 23, 1867.

I claim the reticulated toothed feeding cylinder, B, constructed and operating as herein set forth for the purpose specified.

2d, the combination of the adjustable pulley, K, with the belt, u, which operates the feeding cylinder and the belt or band, J, which operates the ginning saws in such manner that the tension of said belts may be adjusted or regulated by changing the position of the aforesaid pulley substantially as herein set forth.

3d, So arranging the lever, D, in relation to the pawl, g, and in connection with the breast, E, that the same movement of the lever which raises the "breast" shall simultaneously stop the movement of the feeding rollers, e, substantially as herein set forth.

4th, The belts, u and J, operating in connection with the pulley, K, and arranged to actuate the feeding cylinder ginning saws and brushing cylinder substantially as herein set forth.

67,534.—KNIFE CLEANER.—J. F. Hammond, Providence, R. I. assignor to Henry Staples & Co.

I claim the socket, A, the cup, B, with its cup provided with the small openings and the cork, C, or its equivalent all arranged substantially as described and for the purposes set forth.

67,535.—SEWING MACHINE.—H. J. Hancock, New York City.

I claim the combination of the wedge-shaped adjustable disk, K, with the raising and lowering cloth table, I, and stationary foot or presser, H, for operation together substantially as specified and for the purpose or purposes herein set forth.

67,536.—NEEDLE FOR SEWING MACHINE.—H. A. M. Harris, Philadelphia, Pa.

I claim the new article of manufacture constructed substantially in the manner described and constituting a double eye pointed sewing machine needle.

Also the combination with the double eye pointed needle of a shield or cap substantially as and for the purpose described.

67,537.—MODE OF RINGING BELLS.—James Harrison, New York City.

1st, I claim the combination of the lever, m, and cam or eccentric, k, substantially as and for the purpose described.

2d, arranging a pin or rest beneath cam, k, to support it and give it a firm bearing and also curving the under side of the cam, substantially as described.

3d, the combination and arrangement of the movable cam or eccentric, k, with the pawl lever, J, substantially as described.

4th, the combination of the movable cam or eccentric, k, lever, m, and clapper o', substantially as described for the purpose of rotating the bell.

5th, The combination of the movable cam or eccentric, k, and pawl lever, J, with the gearing, H I g F e, worm, d, and wheel, C, substantially as and for the purpose described.

6th, The arrangement in yoke, B, of square hole, n, in the center of round hole, m', for the purpose of receiving the square part, n'', of bolt, o n', substantially as described.

67,538.—STEAM SAFETY VALVE.—J. G. Harrison, New York City.

1st, I claim the combination with a lock up valve box or case, of a ball or globe faced valve, F, working in a suitable socket or seat and carrying a pendulum weight, G, for operation substantially as and for the purpose herein set forth.

2d, The combination of the removable weights, I, with a globe shaped valve, F, and pendulum weight, G, substantially as and for the purpose specified.

67,539.—NUT AND WASHER.—D. B. Hart, Mentor, Ohio.

I claim the within named device, constructed and operating as described or its equivalent, as a new and original mode for the purpose set forth, and used in either or all of the forms herein delineated and described.

67,540.—ALBUM.—Alfred Hathaway, Charlestown, Mass.

1st, I claim a photographic album with an adjustable index constructed substantially as set forth.

2d, An autographic album with opening, C, in its pages when so constructed that the autographs may be inserted or removed through the side of the page substantially in the manner set forth.

67,541.—BRICK MACHINE.—P. Hayden, Pittsburg, Pa.

1st I claim the reciprocating frame, L, so combined with the plunger, I, sliding bottom, l, and mold, K, and so constructed that by its downward movement the brick will be compressed in the mold, K, as set forth.

2d, The grooved cam, F, in combination with the levers, E and o, and spring catch, r, all made as described and operating so that by revolving the cam, F, the lever, o, will be moved back and forth, and the wheel, H, be operated.

3d, The device for locking the wheel, H, consisting of the spring pawls, s, and t, the latter being provided with a projecting pin or lug, t', which is operated by a single cam, substantially as set forth.

4th, The follower, O, when secured to the reciprocating frame, L, in combination with the mold wheel, H, all made and operating substantially as herein shown and described.

5th, The stirrers, G', provided with the oblique arms, d, in combination with the knives e, e', at one end of the opening, c, whereby the amount of clay necessary for each brick is regulated as herein shown and described.

67,542.—PLOW.—J. C. Henry, Point Douglass, Minn.

I claim the combination of the mold board, C, and the stubble turner, B, arranged constructed and operating in the manner as shown and described.

67,543.—STRAW CARRIER.—William Hiler, Branchport, N. Y

I claim the straw carrier, B, when made and applied to a thrasher and cleaner with its adjustable and reversible devices by the arrangement of the wheels, G H J and K, with the axles and grooved pulleys that actuate the straw carrier in combination substantially as herein specified and for the purpose set forth.

67,544.—SEWING MACHINE.—A. C. Hobbs, Bridgeport, Conn.

I claim in combination with the face plate or needle box, b f, the screw, d, and the cam, e, for adjusting and controlling the proper adjustment of said face plate or needle bar box and the needle bar and needle therein substantially as described.

67,545.—SPIRAL FISSURE NEEDLE.—Samuel Hodgins (assignor to himself and Samuel B. Tucker. Said Hodgins, assignor to M. James Barwick), St. Louis, Mo.

1st. I claim the spiral fissure needle, A B, constructed substantially as and for the purpose herein specified.

2d, The combination with the above of haft or shaft, F, attached by means of the screw, D, and socket, C, or in any equivalent manner substantially as described.

67,546.—MEANS FOR REEFING TOPSAILS.—Fridolf Hook, San Francisco, Cal.

I claim the crutch, g, attached to the lower topsail yard and its friction rollers, n n, together with the segments, d d, moving on said rollers and attached to their sides, a a, substantially as and for the purpose described.

67,547.—BOAT DETACHING TACKLE.—Lewis Hover, Chicago, Ill.

I claim the bolts, D D, springs, e e, bars, C C, rods, F F, and lever, G, arranged with the links, B B, for attaching or detaching the boat, A, substantially as herein specified.

67,548.—BRICK MACHINE.—W. H. Hovey, Springfield, Mass.

1st, I claim the combination of the lever beam, J, plungers, G G', and connecting rods, K K', arranged and connected substantially as shown.

2d, The combination and automatic arrangement of the parts as follows the gear wheel, M, operating the crank arm, P, and main shaft, I, the latter turning the shaft V, with its pulleys, I and J, and chair gear operating the revolving knives, H H H' H', and crushers, C C', the whole constructed as shown.

3d, One or more sweeps consisting of the arms, b b, having teeth, c c c, one of them operating automatically with the plungers, so that it fills the chambers alternately with clay when the plunger of each chamber has receded in turn, this or these in combination with the plunger, S and G.

4th, I claim the peculiar shape of the dies, c g', so that they taper from an ellipse to a parallelogram, the width and thickness of the brick desired tapering at the sides but not at the corners, substantially as shown.

5th, Arranging the plungers, G G', so that they may be thrown out of gear, allowing the clay to be ground and worked, but not pressed into brick.

6th, The revolving knives, H H H' H', in combination with the troughs, n n', having the grooves, o o o, arranged substantially as shown.

67,549.—BOLT.—O. D. Hunter, Terrysville, Ct.

I claim the bolt, a, plate, c, clasps, d, constructed, arranged, and operating substantially as and for the purpose described.

67,550.—DEVICE FOR CLEANING WEEDS FROM PLOWS.—Jacob Jameson, Philadelphia, Pa.

I claim the wheel, A, attached to the sliding or yielding stem and held down by a spring, when applied to a plow substantially as and for the purpose set forth.

67,551.—STEAM-ENGINE LUBRICATOR.—Henry and Charles Jarecki, Erie, Pa.

We claim the arrangement of the strainer, D, with the lubricator, substantially as described.

We claim the valve, F, the chamber, a, and the plunger, E, arranged substantially as shown and described for the purposes set forth.

67,552.—NAIL EXTRACTOR.—Henry Jeffrey, St. Charles, Mo.

I claim the steel plates, b b, provided with double or single claws, e e, in combination with the bent lever, A, constructed and operating as described.

67,553.—MACHINE FOR MAKING MOLDINGS.—Nicholas Jenkins, New York City.

1st, I claim the adjustable hook, I K L, arranged to operate in connection with a sliding carriage, C, and cutting arbors, B1 B2, constructed and operating substantially in the manner and for the purpose above described.

2d, I claim the round guide, V, mounted concentric to the arbor of a cutter supported above, as described, and rising and sinking therewith without touching the cutter so as to make any considerable friction against the same, substantially as and for the purpose herein set forth.

3d, I claim the employment, on a cutting arbor supported above, as specified, of the stationary guide, T, mounted below the cutter, and adapted to serve as a guide in a variety molding, substantially in the manner herein specified.

4th, I claim fitting the template upon the wood, H, and securing it thereon, in combination with means for moving both in every direction, the whole being arranged relatively to one or more cutters, Q, revolved above, substantially as and for the purpose herein set forth.

5th, I claim, in a wood-working machine, confining and releasing the entire series of templates, G G1, by confining and releasing the outer one alone, substantially as and for the purpose herein specified.

6th, I claim the single head, w, carrying the two or more carriages, C1 C2, and cutting arbors, B1 B2, and their connections, provided with means for raising and lowering the whole together, substantially in the manner and for the purpose herein specified.

67,554.—BED BOTTOM.—Sam. C. Jennings, Wantoma, Wis.

I claim the spring-bed bottom constructed as described, consisting of two sets of springs, G, their inner ends free and their outer ends secured between the bars, B D, the latter resting either upon the side springs, F, or provided with the elastic blocks, J, and resting upon the loops, E, secured to the side rails, A, all arranged to operate as herein set forth and for the purpose specified.

67,555.—MEDICAL COMPOUND.—Nicholas Joly, Paris, France.

I claim the aforesaid albuminous codliver oil paste or cream made by combining codliver oil and sugar with albumen, substantially as herein described, when alcohol is incorporated therewith to conserve it.

I also claim the combination of fish albumen with codliver oil, substantially as herein described.

67,556.—CHAIR AND COUCH.—James E. Jouett, New York City.

1st, I claim, in combination with the frame and shifting apron, the flattened cross bars, b1 and c, the whole arranged and operating in the manner and for the purposes described.

2d, I also claim the cross bar, i, of the shape described, so that it will lie even with the cross bar, b1, as shown and described for the purpose described.

3d, I also claim, in combination with the reversible frame and shifting apron, the apron sticks with their middle portions enlarged, all as and for the purposes described.

4th, I also claim the employment, in combination with the reversible frame and removable sticks of a shifting apron made with a series of pockets, substantially as and for the purpose specified.

67,557.—BANDAGE FOR CHEESE.—H. N. Kimball, Watertown, N. Y.

I claim the application and use of paper as a bandage, in the manufacture of cheese, substantially as herein specified.

67,558.—PENCIL CASE.—John H. Knapp, New York City.

1st, I claim the plated tube, b, in combination with the shell, a, of a pen and pencil case, substantially as and for the purpose set forth.

2d, Making the slide which serves to move the pen clamp or the pencil tube of such a length that it entirely covers up the slit, f, when the pen or pencil tube is moved back, as described.

3d, The arrangement of two removable caps or nuts, h, in combination with the fluted tube, b, and shell, a, constructed and operating substantially as and for the purpose set forth.

67,559.—MACHINE FOR CLEANING AND BLENDING FIBROUS MATERIAL.—A. J. Loiseau, Philadelphia, Pa.

I claim the combination of the rollers, C C C, provided with the straight or curved teeth, G G, enclosed in the perforated box, A, having doors, E F, the whole arranged and operating as and for the purposes herein described.

67,560.—COOKING STOVE.—Peter Low, Cleveland, Ohio.

1st, I claim the grate furnished with the convex rim, i, constructed as and for the purpose herein set forth.

2d, The adjustable flanged and perforated ribbed end pieces, g, constructed in the manner herein described.

3d, The combination of the rim, i, the end pieces, g, and rim, e, the whole constructed and operating substantially as herein described.

67,561.—BRICK MACHINE.—John McDonald, New York City.

1st, I claim, in combination with the platen, B, or its equivalent, adapted to press the brick flatwise, the employment of levers adapted to press the bricks on their edges, as G1 G2, with or without the end-pressing lever, H, substantially as herein specified.

2d, I claim, in connection with the above, the within described method of operating said levers, that is to say, mounting the said levers on pivots, g h, carried on the platen, and connecting the upper ends of the levers of the adjustable piece, A2, or its equivalent, all arranged for joint operation as herein specified.

67,562.—TABLE FAN.—W. A. McReynolds, Elkton, Ky.

1st, I claim the application of a weight, H, to the rod, E, which drives the oscilating fan frame, D, from the crank wheel, F, of the train of wheels, B, for the purpose of assisting the crank wheel past its center, substantially as as shown and described.

2d, Attaching the rod, E, to a slide, I, placed in a radial groove, e, in the crank wheel, F, with a spring, J, bearing against the slide, for the purpose set forth.

3d, Attaching the chain or cord, b, at its center to the drum, c, and having a hook secured to each end of the chain or cord to admit of the weight, C, being suspended to either end of the chain or cord when said chain or cord drum and weight are used in combination with a train of wheels, B, and a swinging or oscillating fan frame, substantially as and for the purpose specified.

4th, The combination and arrangement of the train of wheels, B, with the weight, C, applied as shown, the oscillating fan frame, D, connected to the

crank wheel, E, and the weighted or loaded connecting rod, E, substantially as and for the purpose set forth

67,563.—TANNING.—John Meehan, Newark, N. J.

I claim the within described process of changing hemlock leather so as to obtain in good part the qualities and appearance of oak tanned leather, substantially as herein specified.

67,564.—PORTABLE FENCE.—Smith Miles, Fabius, N. Y.

I claim the peculiar construction and arrangement whereby each length may be supported at one end by two lateral braces, and at the other by being bolted endwise to the braced end of the next panel on level land, as shown in figure 1, and connected by bolting sidewise as shown in figure 2, for rolling land, substantially as and for the purpose described.

67,565.—WASHING MACHINE.—Philo H. Munson, Franklin Township, Pa., assignor to himself and Elias Brecht. Stonelonia, Pa.

I claim the arrangement of the small rollers, r', with the crank roller, A, pressed down by the lever weight and their connections, all constructed and operated substantially as described.

67,566.—BREAST COLLAR AND SPREADER FOR DOUBLE HARNESS.—John M. Myers, Louisville, Ky.

1st, I claim the construction and arrangement of the looped arms, e e, upon the collar, A, for receiving the neck straps as herein described.

2d, The attachment of the pole strap loop, c, so that it is allowed to have a free lateral play on the bar, C, substantially as described.

67,567.—CLOTHES DRYER.—John J. Newman, assignor to Erwin Wilson, & Co., Middletown, Ohio.

I claim the combination of the hinge, J, arm, F, and pins, E and G, when used in connection with a clothes horse rack, substantially as and for the purpose set forth.

67,568.—BEEF STEAK PREPARER.—Isaac C. Nichols, Union, New York.

1st, I claim the rollers, D E F, when constructed and placed in the relative position to each other, as and for the purpose set forth.

2d, In combination with the above I claim the sliding apron, b, and sliding guide-board, C, as and for the purpose described.

67,569.—WINDLASS.—Capt. D. P. Nickerson, Cleveland, Ohio.

1st, I claim the crown wheel, C, wheels, H J, and lever or shifter, P', in combination with the wheel, J1, worm, L, and windlass, M, as and for the purpose substantially as set forth.

2d, The wheels, D I, shifter, P', and wheel, J, as arranged in combination with the wheel, J1, worm, L, and windlass, M, for the purpose and in the manner as herein described.

2d, The herein described windlass when arranged, so that by shifting the gearing in the manner as above set forth, the power of the windlass is thereby increased, also by reversing the above rotation of said gearing the power will be decreased but the speed augmented, thereby adapting the action of the windlass to moving heavy or light bodies, substantially as specified.

67,570.—SLEIGH BRAKE.—W. A. Niver, Scott, N. Y.

I claim an improved brake for sleighs formed by the combination of the lever dog, E, chain, B, roller, F, and lever, G, with each other, substantially as herein shown and described and for the purpose set forth.

67,571.—SWING.—Aaron B. Nott, Fair Haven, Mass.

1st, I claim an improved swing, formed by the combination of the double rockers, D F and E G, with the supports, A B, and with the frame, J, from which the platform, K, is suspended by the timbers, L, substantially as herein shown and described.

2d, The combination of the springs, o, with the double rockers, D F and E G, substantially as herein shown and described and for the purpose set forth.

3d, The hinge, I, by means of which the movable rockers, F G, are pivted to the stationary rockers, D E, constructed substantially as herein shown and described.

4th, The combination of the rod, N, with the frame, J, and cross-bar, H, substantially as herein shown and described and for the purpose set forth.

67,572.—RAILWAY-CAR SEAT.—E. H. Olmstead, Savannah, Ga.

I claim the construction and arrangement of the arms of the seat, as etc, when said seat is hinged and adjusted in the manner and for the purpose herein described.

67,573.—BROOM HEAD.—T. G. Packer, Mexico, N. Y.

I claim the combination of the concavo-convex crescent-shaped cap A, arms D, binding loops or bands E, hooks F, screw G, binding bar H, and thumb nut I, with each other, substantially in the manner herein shown and described and for the purpose set forth.

67,574.—RUDDER.—J. C. Palmer, New York City.

I claim a rudder so constructed that it may be extended in the manner and for the purpose substantially as described.

67,575.—WASHING MACHINE.—Noyes Palmiter, Scott, N. Y.

1st, I claim the arrangement of the box A, with its slots z z, and ribs a a a, when used in combination with board b, with slots and ribs a', in the manner and for the purposes specified.

2d, The arms B B, constructed as described, and connected to the washboard, when operated by means of the shaft S, wheels F m, crank p, and pitman g, when combined and used for the purposes set forth.

67,576.—APPARATUS FOR CARBURETING AIR.—Francis S. Pease, Buffalo, N. Y.

1st. I claim the combination of the strong-air reservoir, the air pump, and the carbureter, the latter two being contained within the former.

2d, I claim the carbureter constructed as described, with inclined flanged plates in ascending zig-zag series with the air following their under surfaces, substantially as described.

3d, The regulator, constructed as described, consisting of the membrane J, the adjustable rod L, valve I, and the valvular opening, constructed and operating substantially as described.

4th, I claim the inclined flanged plates E, with serrated edges, operating as described.

5th, I claim the arrangement of the series of condensed air holders, constructed of air-tight casks, and combined with an air pump and carbureter, substantially as described.

67,577.—STEAM-ENGINE LUBRICATOR.—T. G. Pelton, Lyons, Iowa.

I claim the combination and arrangement of the valves E and F, and springs C and D, in connection with the pumps, arranged to operate substantially as above stated and for the purpose therein set forth.

67,578.—PORTABLE DOOR FASTENER.—John Pepper, Lake Village, N. H. Antedated July 30, 1867.

I claim a portable door fastener with tapering sides and edges, the sides being smooth for its easy insertion, and the edges nicked or toothed for taking into the wood when turned against it to firmly hold the door, the whole made in one piece, small, compact, and easily carried, as set forth.

67,579.—SOLE-FASTENING TOOL.—Oliver P. Pettengill, Topsfield, Mass.

I claim the combination and arrangement of the series of reversible blocks, B B B B, each made with two separate finishing edges of different sizes, with quadrifacial or prismatic head A, constructed substantially as described.

I also claim the combination and arrangement of the quadrifacial head A, the series of reversible finishing blocks B B B B, the metallic shank e, the handle C, and the counterbalance weight D, the whole being as specified.

67,580.—SAND EJECTOR.—E. W. Poston, Fort Wayne, Ind. Antedated August 1, 1867.

1st, I claim cylinder A, and heads B B', in combination with piston E, and piston rod F, the whole being arranged and constructed in the manner and for the purpose described.

2d, In combination with the above, I claim the bent tube H, in combination with the distributing plates L, and feeder I, all being constructed and arranged substantially as described and set forth.

67,581.—WASHING MACHINE.—M. S. Prentice, Rockford, Ill.

1st, I claim the combination of the bent or bell crank levers D, with the arms c', of the beater C, and with the box or tub A, to which their lower ends are pivoted, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the self-adjusting cheek board F, with the beater or plunger C, and with the box or tub A, substantially as herein shown and described and for the purpose set forth.

67,582.—GATHERING DEVICE FOR SEWING MACHINES.—T. K. Reed, East Bridgewater, Mass.

1st, I claim a gathering device, having a spring-bearing point outside the line of feed to deflect the cloth against a straight edge inside the line of feed.

2d, The combination of such a spring-bearing point with a separator as described.

3d, The combination in a gathering device of a separator, a spring bearing point outside the line of feed, and a straight edge, for the purposes set forth.

4th, A gathering mechanism, so constructed as to be attachable to the presser foot, and provided with a bearing point outside the line of feed.

67,583.—VALVE FOR STEAM ENGINES.—Edwin Reynolds, Boston, Mass., assignor to himself and James A. Woodberry, Winchester, Mass.

I claim the construction of a valve in the form of a hollow cap, provided with suitable recesses and ports or openings for passages, when arranged to work upon a suitable projecting cap as a seat, also provided with suitable ports or passages, substantially as described, said caps being preferably made conical as a provision for wear.

Also, the compound cam, when constructed and arranged to operate substantially as described.

67,584.—MACHINE FOR SHAVING AXES.—H. C. Reynolds, Manchester, N. H.

I claim the improved machine for shaving axes, constructed as described, consisting of the convex bed A, concave reciprocating slide F, cutters E, upon the handle I, placed between the bars K K, all operating substantially as herein shown and described.

67,585.—BED BOTTOM.—Geo. W. Robbins, Fond du Lac, Wis.

I claim a bed bottom consisting of the spiral spring C, slats D C, springs, F, and spring boards G, when arranged to operate as described and for the purpose set forth.

67,586.—PRINTING PRESS.—Leander Rodney, N. Y. City.

I claim the combination herein described consisting of the rotating impression cylinders advancing continuously in one direction, counterbalanced and passing over a series of stationary forms placed in right lines in two rows, one over the other, substantially as and for the purposes herein set forth.

67,587.—MACHINERY FOR CUTTING BEVEL GEARS.—Charles E. Roper, Canton, O.

1st, I claim the combination of the slide, L, the sliding platform, M, the box, N, and the swivel block, O, constructed and used in the manner and for the purpose set forth.

2d, The combination of the piston, B, box, C, plate, D, arm, E, provided with the tool, R, the bar, F, and standard, G, constructed and arranged substantially as and for the purpose set forth.

67,588.—PAINT BRUSH.—H. Rosenthat, New York City.

I claim the application of dust or sand to the upper ends, C, of the bristles before cement is applied, whereby the spaces between said bristles are completely filled and the end, C, made solid and prevented from being compressed and withdrawn from the ferrule, as herein set forth for the purpose specified.

67,589.—STEAM GENERATOR.—Abram Rowe (assignor to himself, Charles Chandler, and James Duncan), Macomb, Ill.

I claim a steam boiler consisting of a series of concentric chambers, e, opening at their upper end directly into a steam chamber, and provided with the smoke flues, a, of a constantly increasing area from the center outward, said chambers being connected by the lateral tubes or water passages, m, all constructed and arranged substantially as shown and described.

67,590.—GUIDE FOR SEWING MACHINES.—E. Safford and O. H. Masters, Boston, Mass.

We claim one or more adjustable springs, D, with or without the plate, G, in combination with the gage, B, operating substantially as and for the purpose set forth.

We also claim the slotted plates, a, in combination with the gage, B, and the clamping screw, C, or its equivalent, substantially as and for the purpose set forth.

67,591.—THREAD HOLDER AND CUTTER FOR SEWING MACHINES.—J. A. Sawyer, Worcester, Mass.

1st, I claim the combination with the table of a wax thread sewing machine, of a thread holding device to enable the operator to draw up the last stitch, substantially as set forth.

2d, The combination with the table of a wax thread sewing machine, of a thread holder and a knife, substantially as and for the purposes set forth.

3d, The combination with the movable piece, C, and knife, G, of the handle, D, substantially as set forth.

4th, The combination with the table, A, and lever, D, of the adjustable block, F, and spring, f, substantially as and for the purposes set forth.

5th, The combination with lever, D, of the spring catch, I, substantially as and for the purposes set forth.

67,592.—STEAM PUMP.—Rudolph Schmidt, New York City.

1st. I claim the arrangement of the pistons, e e, and small piston, e', upon the rod sliding in the steam chest, G, the vertical rod, h, with collars, l l', operated from the piston, D, substantially as shown and described, whereby the ports for the admission and exhaust of steam are opened and closed, as and for the purpose specified.

2d, The arrangement of the stuffing box, F, whereby the two cylinders are separated, substantially as shown and described.

67,593.—STOVE LID LIFTER.—Geo. B. Scribner, Indianapolis, Ind. Antedated Aug. 1, 1867.

I claim the combination of the several parts, A B C D E, arranged and formed substantially as and for the purpose set forth.

67,594.—COMBINED CHURN AND BUTTER WORKER.—Samuel H. Scribner, Stowe, Vt.

I claim, 1st, The churn dasher, C, constructed of the crosses, d d1, provided with cross pieces, d3 d3, set diagonally to the center, each four of the same being in line with and parallel to each other, constructed and arranged as described.

2d, The butter worker dasher, d, constructed of the cross, k k', beaters, m m, and adjustable rollers, n n, substantially as and for the purposes set forth.

67,595.—CULTIVATOR AND PLOW.—S. F. Seely, Sylvania, O.

I claim the jointed draft rod, I, adjustable link, G, beam, A, standard, C, with oblong slot, d, brace, D, handles, B, share, E, wings, F, cross rod, c, and brace rods, a², combined, arranged, and operated substantially as described for the purpose specified.

67,596.—PLATFORM SCALE.—Lyman M. Severance, Dixon, Ill.

I claim the combination of the four levers, D D E E, when arranged with respect to the platform and its permanent frame and the rod, F, substantially in the manner and for the purposes herein specified.

67,597.—WASHING MACHINE.—Henry Sidle, Minneapolis, Minn.

I claim the shaft, B, provided with its angular arms, C C, and beveled cog wheel, D, and operated by means of the wheel, E, between the frames, G and H, with its handle, F, in the manner and for the purposes set forth.

67,598.—HEEL MEASURE.—J. T Siegert, Washington, D. C.

I claim the measure, A, with its curved point, B, and its adjustable flat side, C, with its flat spring, D, when constructed, combined, and operated as herein described and for the purposes set forth.

67,599.—ICE CREAM FREEZER.—W. H. Skerret, Cincinnati, Ohio.

I claim the cylinders, B and C, revolving on the axis, y, in combination with the driving wheel or governor, I, substantially as and for the purpose described.

67,600.—CHERRY STONER.—E. Smith, Farmington, Ill.

I claim the inclined box, A, in combination with slide, H, carrying needles, L, and discharge bar, M, substantially as and for the purpose described.

67,601.—PASTRY CUTTER.—John Stephen, Womelsdorf, Pa.

I claim the rod, A, provided with fork, B, and print, C, upon its ends and provided with four arms, a a a, projecting from its sides said arms having arranged wheels, D D E F, and cutter, G, and plain wheel, H, all constructed, arranged and used as herein set forth.

67,602.—LADIES THIMBLE.—John Stephen, Womelsdorf, Pa

I claim a thimble provided with the radiating grooves, x x, and at their ends with the grooves in the ring or flange, c, substantially as and for the purpose herein specified.

67,603.—POT HOLE LID FOR COOKING STOVES.—John Stephen, Womelsdorf, Pa.

I claim the use of the lid, A, concave at its top and convex at the bottom with its damper plate, A' and circumferential flange, c, with the stove, G, in the manner as specified.

67,604.—BED BOTTOM.—Washington Stickney, Lockport, N. Y.

I claim the brackets or supports, c c c, india-rubber loops, c c, keys, g g g, rods, h h and d d, in combination with a bed bottom constructed substantially in the manner and for the purpose herein set forth and described.

67,605.—FAUCETS.—J. T. Stilwell, Dowagiac, Mich., assignor to himself and E. P. Townsend.

I claim, 1st, The cylinder, B, constructed substantially in the manner described and used with the plunger, G, and its rod, and the case, H, as and for the purpose specified.

2d, The case, H, provided with the cock, J, and used with the rim wheel, M, and its pointer, O, substantially as and for the purpose set forth.

67,706.—SASH FASTENER.—S. E. Strickland, Amboy, Ill.

I claim a sash fastener formed by the combination of the parts, A B C and D, respectively constructed and arranged to operate substantially as set forth.

67,607.—DAIRY CAN.—L. A. Sunderland, Chagrin Falls, O.

I claim the supplementary bottom, D, with radial arms, E, lining, F, and central support or boss, F' as arranged in combination with the can, A, for the purpose and in the manner described.

67,608.—BOILER WATER GAGE.—D. M. Swain, La Crosse, Wis.

I claim the float, A, and its arm, the supports, D, rod, F, arm, G, shaft, b, segment, d, pinion, e, pointer, P, spring, S, arm, H, and shoulder, I, arranged and operating substantially in the manner and for the purposes specified.

67,609.—HORSE RAKE.—B. C. Taylor, Dayton, Ohio.

I claim the bracket fastening, B' constructed with one ear and a flange or housing extending from said ear in front and over the eye of the tooth, in combination with the washer, D', substantially as and for the purpose described.

67,610.—INVALID BED ATTACHMENT.—Norman Teal, Kendallville, Ind.

I claim, 1st, A sick bed attachment attached to an ordinary bedstead, substantially as described for the purpose specified.

2d, The sheet, I provided with the slit, K, and fly, J, in combination with the adjustable rollers, d d, and frame, F, substantially as described for the purpose specified.

3d, The combination of the cross pieces, C, bands, H H', rollers, b b' frame, F, provided with hinged legs, slit sheet, I, with fly, J, and adjustable rollers, d d, substantially as described for the purpose specified.

67,611.—SPIRIT METER AND REGISTERING APPARATUS.—I. P. Tice, New York City.

I claim, 1st, The connection substantially as herein described of the meter with the worm of the still, by means of a blow off pipe of close character and provided or operating with a valve that admits of expulsion of the air without giving motion to the measurer but is self-closing on the flooding of the meter to prevent escape of the liquid at or through said pipe as specified.

2d, The overflow pipe or spout, D, for operation in connection with the valvular box, I, or its equivalent to limit or regulate the finishing supply to the measuring can or cans, essentially as herein set forth.

3d, The combination of the beam, H, rack, l, and pinion, k, for action of the sample-taker, J, as described.

4th, the application of a check valve to the sample can to prevent injection from the exterior, substantially as specified.

5th, The combination with a meter of a detector valve, M, of suitable description, for operation in the manner and for the purpose herein set forth.

6th, The application to a meter, of an index operated by a float on any undue accumulation of liquid in the meter.

7th, The combination of a roller stop, Q, to the measurer, G, of a meter, essentially as and for the purpose herein set forth.

8th, In the registering apparatus of a meter, communicating motion to the several indices which denote the multiples, by means of a shaft, S, having screw threads, r, of different pitch and gearing with worm wheels, T, of a corresponding pitch.

9th, The application to a meter of a proof tester for operation in connection with the registering apparatus of quantities and serving, by means of a weighing can, beam and independent weights, or their equivalents, to actuate a suitable registering apparatus of specific gravities, essentially as specified.

10th, The attachment to a proof tester, operating substantially as described, of a thermometric weight adjuster for automatically adjusting said tester to the variation in weight of a given volume of liquid by fluctuations in the temperature of the latter affecting its specific gravity, substantially as specified.

11th, Controlling the registering apparatus of specific gravities, by means of a templet G' operating in connection with devices in gear with the registering apparatus of quantities in a meter, essentially as herein set forth.

12th, I claim the use of enameled iron or other metal in the construction of the meter safes and for the reservoirs and constructing pipes of the same.

67,612.—FRAME FOR MOSQUITO NETS.—M. L. Treadwell, New York City.

I claim the detachable frame for mosquito nets constructed as described consisting of the supporting rods, B B, sockets, c c', vertical rods, C, having sockets, d, covered rods, D, and horizontal rods, E, with perforated and slotted ends, upon the tops of the rods, C D, parallel rods, F F', having guides, f, and hooks, h, all arranged as described for the purpose specified.

67,613.—HOSE NOZZLES.—James Trees, Greensburg, Pa.

I claim the combination, substantially in the manner described, with a pipe or nozzle of uniform taper of two cones arranged base to base concentrically within the pipe.

67,614.—WATER PIPE.—James Trees, Greensburg, Pa.

1st, I claim a pipe composed of frustra of cones of alternately varying inclination arranged base to base, substantially in the manner and for the purpose described.

2d, The combination, substantially in the manner described, with a pipe composed of frustra of cones arranged base to base, of a corresponding series of cones arranged concentrically within the pipe, for the purpose set forth.

67,615.—CHURN.—Charles A. Van Horn, Chenango, N. Y.

I claim the arrangement of the gear frame, G G G, in combination with the dashers, D and E, and perforated disk, F, all being constructed and arranged substantially as set forth.

67,616.—NUTMEG GRATER.—Louis Von Froben, Washington, D. C.

I claim the hollow cylinder, G, provided with openings, g g, in one end thereof and journalled in the elongated lugs or legs, F F, in combination with the said legs, F F, tube, A, sliding piston, B, finger pieces, D D, and screen, J J, the whole constructed and arranged in the manner and for the purpose specified.

67,617.—CHURN DASHER.—D. F. Wallace and D. T. Cockerill, Ripley, Ohio.

I claim a churn dasher, in form substantially as set forth, when provided with the openings, a a a, so arranged that the several axes of each of the groups, h h h, shall converge outwardly as and for the purposes specified.

67,618.—COFFEE MILL.—Joseph Watrous, Jr., Mystic River, Conn., assignor to the Mystic River Hardware Manufacturing Company.

I claim attaching the basin shaped hopper, f, to the conical case or shell of the mill by the lip, l, hooked flange, c, and inclined projection, n, as specified.

67,619.—BURGLAR ALARM.—Samuel Whitaker, Macon, Ill.

I claim the arrangement of the box, A, with its door, I, rod, J, shaft, x, with its rod, K, pallet, G, and arm, H, bell, D, and respective parts for operating the same when constructed, arranged and used in the manner substantially as and for the purposes set forth.

67,620.—HAT HOOK FOR PEWS.—R. W. Whitney, South Berwick, Me., and Judson W. Shaw, Concord, N. H.

1st, We claim the flanged bracket in combination with the folding hook, arranged and operating substantially as described.

2d, The hook, C, arranged to turn upon a horizontal pivot in bracket, A, and provided with the stop, c, operating in combination with said bracket, substantially as described.

67,621.—STEAM GENERATOR.—S. Lloyd Wiegand, Philadelphia, Pa.

1st, I claim the combination of the external and internal tubes as described with the vessels into which they are inserted and the perforated plate o plates as described.

2d, The construction of screw caps, M, as shown and described.

3d, The making of the internal and external tubes of different metals, so as to produce a galvanic action thereby.

67,622.—COMBINED LANTERN AND FOOT WARMER.—Stephen M. Wiats and F. Swift, Hudson, Mich.

We claim the arrangement of the box, A, with case, I, lining, J, plates, H and a, and door, C, as constructed, substantially as and for the purpose specified.

2d, The door, B, as constructed when arranged in combination with the forgoing, for the purpose of forming a lantern and foot warmer, substantially as set forth.

67,623.—PLANING MACHINE.—George E. Woodburg, East Cambridge, Mass.

I claim adjusting the mouth piece, f, of a planing machine in relation to the edges of the cutters by attaching the former to a movable frame, h, which is hung or pivoted so as to operate substantially in the manner and for the purpose specified.

67,624.—RIVET.—John E. Wootten, Cressona, Pa.

1st, I claim a tubular rivet made by coiling a strip of iron, and then welding the same as set forth.

2d, A tubular rivet in which the grain of the iron takes a transverse course at right angles or thereabouts to the axis of the rivet as described for the purpose specified.

REISSUES.

2,710.—HORSE RAKE.—Sylvester E. Ament, Oswego, Ill.

Patented Feb. 9, 1864. Reissued July 26, 1864.

1st, I claim the metallic bearing girdle, D, adapted to be fixed upon the shaft, A, of a revolving rake, A a a, substantially as and for the purpose herein set forth.

2d, I claim forming the metallic bearing girdle, D, of two halves, and applying it to the shaft, A, by means of lugs and bolts, substantially as and of the purpose herein set forth.

3d, I claim the metallic bearing girdle, D, provided with one or more pairs of radial or perpendicular faces, W Y, erected, formed or fixed therein or upon, substantially as and for the purpose herein set forth.

4th, I claim in combination with a single handle revolving rake, A a a E, when its locking devices do not depend upon the teeth for resistances, except uniformly upon the whole through the medium of the shaft, A, the employment of one or more pairs of reversed faces, W Y, arranged within the same cylindrical, bar separate vertical planes, substantially as and for the purpose herein set forth.

5th, I claim in combination with a single handled revolving rake, A a a E, when its locking devices do not depend upon the teeth for resistances, except uniformly upon the whole, through the medium of the shaft, A, the employment of one or more pairs of reversed faces, W Y, arranged relative to bolts, I and J, or their equivalents, substantially as and for the purpose herein set forth.

6th, I claim the employment of the sectional eccentric peripheries of the fingers 1 and 2, arranged relative to bolts, I and J, and to one or more pairs of reversed faces, W Y, substantially as and for the purpose herein set forth.

7th, I claim in combination with a single handed revolving rake, A a a E, when its locking devices do not depend upon the teeth for resistances, except uniformly upon the whole, through the medium of the shaft, A, the employment of two locks, each operating independently of the other, substantially as and for the purpose herein set forth.

8th, I claim the metallic brush or saddle, F, formed with side cheeks, F 1 F2, and with notches or holes, f1 f2, and adapted to serve in connection with the handle, E, and with sliding bolts, I and J, substantially in the manner and for the purpose herein set forth.

9th, I claim bracing the two series of teeth by the employment of two series of braces, F F, arranged to form an additional direct connection from the shaft, A, to the teeth, a a, substantially as and for the purpose herein set forth.

2,711.—SODA WATER APPARATUS.—Edmund Bigelow, Springfield, Mass. Patented June 23, 1859.

1st, I claim the combination of the conduit through which the mineral waters are drawn, and the sirup cans with the ice reservoirs all in one stand or caster, substantially as and for the purpose described.

2d, I also claim an air vent in or connected with the valve stem of a measuring faucet as above set forth, or in any manner substantially the same.

3d, I also claim in combination with a sirup caster, substantially as herein described, a measuring faucet or its equivalent, so made that when the discharge port is opened the supply port is closed by proper plug or other formed valves, connected with a stem so arranged that it admits external air into the measuring chamber when the discharge port is opened by the movement of said stem, all substantially in the manner and for the purposes herein set forth.

2,712.—MACHINE FOR MAKING AUGERS.—W. W. Grier and R. H. Boyd, Hulton, Pa. Patented May 22, 1866.

We claim the means substantially as herein described for twisting the blank, in combination with the series of dies for clasping and holding the twist as it progresses, substantially as and for the purpose described.

And also we claim the means by which the twist is given to the blank and which consists of the combination of the instrument having an aperture of the form of the cross section of the blank which slides on the blank the holder to hold the blank or the equivalents thereof, for imparting simultaneously a longitudinal and a rotary motion, the combination having a mode of operation, substantially such as hereinabove set forth.

2,713.—APPARATUS FOR DISCHARGING BILGEWATER FROM VESSEL HOLDS.—August Hermann, New Haven, Conn. Patented Oct. 2, 1866.

I claim the apparatus consisting of a vertical shaft or axle, I K, provided at its lower end with projecting chambers or flanges, T T T, and operating within a cylinder and provided with valves, U, or with valve, Q, or both, the whole constructed and arranged so as to operate substantially as and for the purpose described.

2,714.—HEATING STOVES.—Charles Jones, Philadelphia, Pa. Patented July 17, 1860.

I claim a dust or check-draft flue inside of a heating or cooking stove, also applicable to heaters and ranges, leading from the space or ash-pit below the grate to the space above the fire or into the escape flue or pipe which conducts away the smoke or products of combustion for the purpose of carrying off the dust and ashes when the fire is raked, which flue may be placed either in the rear, in front or at the side of the fire pot or box.

And in combination with the dust flue arranged as above claimed, I claim a damper or other device for closing the flue, F, and making the air or draft draw through the fire substantially as described.

2,715.—HOOP SKIRT WIRE.—J. N. McIntire, New York City, assignee of T. B. DeForest. Patented Nov. 13, 1866.

I claim a metallic strip or wire, coated over with a fibrous substance and afterward openly braided, substantially as described.

I also claim a covered wire composed of a metallic core, a coating of fibrous material, openly braided jacket, and a surface finish of starch, or other glazing compound, substantially as described.

I also claim preparing the wire previous to the application of the first covering with some water proof solution, substantially as described for the purpose set forth.

2,716.—METALLIC CARTRIDGES.—Isaac M. Milbank, Greenfield Hill, Conn. Patented Feb. 19, 1867.

1st, I claim a metallic base, c, of sufficient strength to resist the force of the hammer in exploding the fulminate, in combination with a sheet metal cartridge case when the said base is introduced within the cartridge case, and secured thereto by soldering or brasing, as and for the purposes set forth.

2d, I claim the base, c, soldered or brazed inside the sheet metal cartridge case, a, in combination with the fulminate tube, i, setting within an opening in the base, c, as and for the purpose set forth.

3d, I claim strengthening the base of an ordinary sheet metal cartridge case by a disk or base soldered or brazed within said case, substantially as set forth.

2,717.—INSULATOR FOR TELEGRAPH WIRES.—David Brooks, Philadelphia, Pa. Patented Nov. 29, 1864.

1st, I claim the use, in the manner described, of a hollow cylinder, h, of paper or its equivalent in connecting the glass block, B, to the casing, A, by means of sulphur.

2d, The use of paraffine as an insulating medium in telegraphic wire insulators, in the manner described, or in any other manner by which the same result is attained.

3d, The use in connection with telegraph wire insulators of sulphur or any other porous cement saturated with paraffine.

2,718.—OIL TANK.—J. B. Button, Cleveland, Ohio, assignee of H. Pierce and J. B. Button. Patented Jan. 22, 1867.

1st, I claim the wooden bottom of iron tanks for holding oil when such wooden bottom is placed within the body of the tank and spiked or otherwise secured to the sills which support the tank and to which the body of the

tank is also attached, either directly or with an intervening floor substantially as hereinbefore described.

2d, Also the rim or abatment pieces, F, inserted into recesses in the sills, B B, for supporting the flooring of oil tanks, substantially as hereinbefore described.

3d, Also the combination of the foundation sills, B B, flooring, G, with a metallic tank, H, bolted to the foundation and an inserted wooden bottom, G, also fastened to the foundation, constructed and arranged substantially as hereinbefore described.

2,719.—Swage for Sharpening Saws.—James E. Emerson, Trenton, N. J. Patented June 5, 1866.

1st, I claim swaging the teeth of saws and forming them into suitable shape and width and bringing them to a proper feather or cutting edge at one operation by the combined operation of a die in or on the piece of steel and a blow upon the swage, substantially in the manner and for the purpose set forth.

2d, The swage stock or handle, A, and the pin, B, when combined and used substantially in the manner and for the purpose set forth.

3d, The groove, h, when used in combination with the swage for the purpose of allowing the teeth of the saw to come up to the die as herein set forth.

2,720.—Composition or Paste for Article of Food.—R. M. Livingston, Mobile, Ala. Patented June 4, 1867.

I claim a compound or paste of which cheese is the basis, and the admixture of any suitable seasoning or flavoring ingredients in the manner and for the purpose specified, whether in the ratio described or in any other, substantially the same.

2,721.—Dust Pan.—Joseph Hall Rohrman, Philadelphia, Pa. Patented June 7, 1859.

1st, I claim a dust pan formed with corrugations, substantially as described for the purposes set forth.

2d, I also claim forming the back edges of the pan in the manner described, whereby it is rendered sufficiently rigid without any wiring.

2,722.—Paint for Ship's Bottoms.—James G. Tarr and Augustus H. Wonson, Gloucester, Mass. Patented Nov. 2, 1852.

We claim a paint made of oxide of copper with a basis and medium substantially as described.

2,723.—Horse-power.—Edsell Totman, Columbus, Pa. Patented March 14, 1865.

1st, In combination with a stationary open wheel, B, having a driving shaft, C, passing through its center and which carries upon one end a pinion open wheel, g, I claim the rotating open wheel, E, and pinion, h, applied on the short arm of a triangular sweep, D, which turns about the axis of said shaft and carries those wheels, E and h, around with it, substantially as described.

2d, Sustaining the revolving sweep, D, by means of a transverse brace, D2, which is applied loosely to a fixed hub, b, through which the driving shaft passes, said sweep being arranged over the stationary wheel, B, and carrying the wheels, E and h, substantially as described.

3d, In conjunction with a sweep, D, which turns freely around a fixed hub, b, and driving shaft, C, and which carries the spur wheels, E and h, upon one end, I claim the use of lower guides, 1 k, or their equivalents, applied beneath the stationary wheel, B, substantially as described.

4th, The sweep, D, cross brace, D2, hollow hub, b, stationary wheel, B, and the lower guides, 1 k, arranged and operating in a machine, substantially as described.

5th, In combination with the sweep, D, revolving around a fixed hub, b, and driving shaft, C, and carrying the wheels, E h, around the stationary wheel, B, I claim the use of a removable shaft, C', carrying a driving pulley, N, substantially as described.

6th, In combination with the sweep, D, revolving around a fixed hub, b, and driving shaft, C, and carrying the wheels, E and h, around the stationary wheel, B, I claim the use of a balance wheel, H, carrying a wrist pin, m, and pitman rod, I, and arranged beneath the supporting beam, A', and frame, A, substantially as described.

2,724.—Cupola and other Melting Furnaces.—Charles Truesdale and Wm. Resor & Co., Cincinnati, O., assignees of Charles Truesdale. Patented May 1, 1866.

1st, We claim the combination with a cupola or blast furnace of a system of tweers having openings so arranged as to discharge a blast of greater volume below than above, as set forth.

2d, The provision in a cupola or melting furnace of one or more vertical series of tweers with graduated or decreasing ventags toward the upper portion of the series, substantially as set forth.

3d, The arrangement of one or more vertical series of tweers which project beyond the common or lining wall, and are protected by vertical piers, substantially as set forth.

2,725.—Spring Hinge.—Charles E. Stanley, Cleveland, O., assignee of Dr. Joseph S. Smith. Patented May 19, 1857.

1st, I claim the construction of a hinge with a tubular joint having a torsion spring therein, and with devices for adjusting and retaining said tension, substantially as and for the purpose described.

2d, The combination of the center pin, screw pin, headed or capped spring, and tubular hinge, constructed and arranged to operate as and for the purpose substantially as described.

DESIGNS.

2,714.—Cannon Stove.—Wm. Caven (assignor to Redway & Burton), Cincinnati, O.

2,715.—Label.—John Fahnestock (assignor to Jas. Buchan), New York City.

2,716.—Stove Top.—Wm. L. McDowell, Philadelphia, Pa.

2,717.—Statuette.—J. S. McKaye and H. G. McKay, New York City.

2,718.—Charcoal Stove.—A. J. Redway (assignor to Redway & Burton), Cincinnati, O.

2,719.—Pocketbook.—Simon & Isaac Schener, New York City.

2,720.—Fork or Spoon Handle.—Joseph Seymour, Syracuse, N. Y.

2,721.—Casket Handle.—Stephen D. Arnold, New Britain, Ct., assignor to P. & F. Corbin Joint Stock Corporation.

2,722.—Trade Mark.—C. O. Benton, Cleveland, O.

2,723.—Plates of a Parlor Stove.—D. S. Colby and Robert Scorer, Troy, N. Y.

2,724.—Post and Fence.—Charles Coats, Rochester, N. Y.

2,725.—Trade Mark.—James B. Crump, Portland, Mo.

2,726.—Lamp Chimney.—Edward Dithridge, Pittsburgh, Pa.

2,727.—Reflector.—Edward Dithridge, Pittsburgh, Pa.

2,728.—Ornamental Star.—John Dundas, New York City.

2,729.—Cook's Stove.—John Martino, Jacob Beesley, and John Currie, Philadelphia, Pa., assignors to C. W. Blandy & Brother, Newark, Del. Antedated July 18, 1867.

2,730, 2,731.—Floor Oilcloth and Carpet Pattern.—Charles T. Meyer, Bergen, assignor to Edward C. Sampson. Two patents.

2,732.—Cook's Stove.—Clement Olhaber, Cincinnati, O., and Nicholas S. Vedder, Troy, N. Y., assignors to Woodrow, Means & Co., Cincinnati, O.

2,733.—Pillar.—Wm. S. Rockwell, Savannah, Ga.

2,734, 2,735.—Plates of a Stove.—Nicholas S. Vedder, Troy, N. Y. Two patents.

2,736.—Plate and Doors of a Stove.—Nicholas S. Vedder, Troy, N. Y.

2,737.—Plates of a Stove.—Nicholas S. Vedder, Troy, N. Y.

2,738, 2,739, 2,740.—Doors of a Stove.—Nicholas S. Vedder, Troy, N. Y. Three patents.

2,741.—Handle of a Fork or Spoon.—Dennis C. Wilcox, West Meriden, Ct., assignor to Meriden Britannia Company.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

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1,778.—Machinery for Burring and Dressing Printers' Types.—Patrick Welch, New York City. June 17, 1867.

1,782.—Apparatus for Holding and Lifting Plates and Dishes.—Howard Tilden, Boston, Mass. June 18, 1867.

1,784.—Heating and Annealing Furnace.—The Union Car-spring Manufacturing Company, New York City. June 18, 1867.

1,824.—Combined Feed-water Regulator and Water Gage for Steam Boilers.—Lewson E. Chase, Boston, Mass. June 22, 1867.

1,826.—Nipper.—Wm. S. Millar, Thos. G. Hall, and Albert Michelsberg, New York City. June 22, 1867.

1,837.—Cylindrical or Argand Gas Burner.—Elliott P. Gleason, New York City. June 24, 1867.

1,879.—Self-detaching Coupling for Railway Carriages.—Ernest Von Jeinsen, New York City. June 27, 1867.

1,923.—Manufacturing Cordage, Webbing, etc.—Jesse Fewkes, Newton, Mass. July 3, 1867.

1,947.—Manufacture of Illuminating Gas, and Apparatus Employed in said Manufacture.—Geo. A. McIlhenny, Washington, D. C. July 4, 1867.

1,959.—Blankets Used in Machines for Printing Textile Fabrics, and Mode of Joining Together the Ends of Double Woven Fabrics.—Seth W. Baker, Providence, R. I. June 28, 1867.

1,994.—Adjustable Wrench.—J. P. Lindsay, New York City. June 28, 1867.

1,969.—Manufacture of Soda Water and other Aerated Liquids.—John Matthews, Jun., New York City. July 3, 1867.

1,962.—Breech-loading Fire-arm.—Edwin F. Gunn, Charleston, S. C. July 4, 1867.

1,963.—Combined Ship's Propeller and Steerer.—Frank G. Fowler, Springfield, Ill. July 4, 1867.

1,966.—Steam Engine.—Hamilton Ruddick, Chelsea, Mass. July 4, 1867.

1,970.—Elastic Strap for Garments.—Phineas T. Barnum, New York City. July 5, 1867.

1,973.—Machinery for Manufacturing Metal Tubes.—Chas. G. Smith, Chelsea, Mass. July 5, 1867.

1,991.—Mode of Training Hop and Grape Vines, etc.—Levi H. Whitney, Vallejo, Cal. July 8, 1867.

2,018.—Machinery for Manufacturing Cards for Combing or Carding Fibrous Materials.—A. B. Prouty, Worcester, Mass. July 9, 1867.

2,033.—Boots and Shoes.—Edward Heaton, New Haven, Ct. July 11, 1867.

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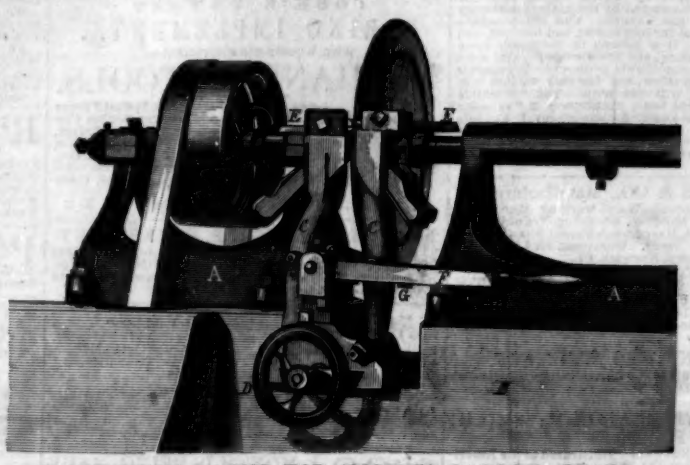
Improvement in Turning Barrel Heads.

The engraving represents an exceedingly simple machine for turning and chamfering the heads of barrels and casks and the bottoms of tubs, pails, etc. It would seem to be a very efficient contrivance for the purpose.

There are two heads or stocks, A, similar to those of an ordinary lathe, mounted upon shears or a frame, B, one spindle—the "live" one—having a fast and loose pulley, and the other—the dead spindle—sliding back and forth by means of a screw and hand wheel in the ordinary manner. To the live spindle is secured a circular flange or head which, of course, rotates with the spindle. There is a duplicate attached to the dead spindle, but turning upon it as a wheel upon its axle. To hold securely the stuff placed between them to be turned, their inner faces are provided with spurs. Secured to the bed of the lathe is a stand which supports two uprights, C, which are pivoted to a table, the lower part or base of which slides by a dovetail slot in the stand and can, with its appurtenances, be moved in or out by means of a screw and hand-wheel, D, as the carriage on a lathe. Thus, the apparatus can be adapted to the different sizes of work to be done.



SPAULDING'S LATHE FOR CUTTING BARREL HEADS.

The uprights are pivoted at their lower ends to suitable stands on the table or carriage, and the other ends are adapted for the reception near their tops of turning tools, E, held horizontally in place by means of set screws, as the tools in a turning lathe are held. Just below them, and set at an angle to chamfer the edge of the head properly, are two plane irons secured in the usual manner. These cutters and planes are advanced to or receded from the work by a hand lever, F, and suitable links, shown plainly in the engraving, and the limit of their approach is determined by a set screw—the head of which is seen under the lever, at G—passing through one of the uprights and setting against the other.

The operation can, from the foregoing description, be readily understood. A square piece of stuff is put in the lathe between the disks and secured by bringing the disks together. Power is then applied and the disks with their engaged material rapidly rotated. The hand lever is then depressed, the cutters engage with the stuff, separate the corners, which are thrown off by centrifugal force, and the planes form the bevel or chamfer.

The device was patented through the Scientific American Patent Agency March 7, 1865, by E. P. Spaulding, who may be addressed at 2,147 Chonteau Avenue St. Louis, Mo.

Use of Distilled Water.

In Mr. Quin's report upon the Paris Exhibition, reference is made to the use of distilled water at the Wallaroo Copper Mines in South Australia, stating that until tanks for collecting rain water had been constructed, "perhaps for the first time in the history of the world, there was a population of some thousands, with all their horses, cattle, sheep, etc., drinking *aqua distillata*." As many readers may not be aware of the fact, it may be interesting here to mention that in the rainless region of the Pacific coast of South America, the entire population of the country between about the 18th and 28th parallels of south latitude, or some 600 miles from south to north, including the important towns of Caldera, Cobija, Iquique, Pisagua, and several minor ports, have for many years derived their supply of potable water from the sea water of the Pacific, distilled in greater part by coal imported from England, and costing above £3 per tun.

Not only is a population of many thousand inhabitants, principally engaged in the mines of this district, as well as a still larger number of beasts of burden and other animals, supplied from this source, but even the locomotives on the Copiapo and Caldera railway, and some steam engines for other purposes, are actually driven with distilled water. For a distance of some thirty to fifty miles inland from the coast, very few natural springs are met with in this rainless desert, and when met with they are seldom sufficiently free from saline matter to be potable.—*Cor. Chemical News.*

PATENTS

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